EDUCATIONAL REVIEW

APRIL, 1903

I

MORAL EDUCATION IN PUBLIC SCHOOLS[1]

Two convictions, firmly imbedded in the American mind, are to-day the source of our greatest strength and our deepest perplexity. Those convictions, which underlie and explain our history, are: the necessity of educating the entire people, and the necessity of the absolute independence of Church and state. If we could surrender either of these primary principles our path would be easy. But maintaining, as we do, that the state must superintend education in order to make it universal, maintaining at the same time that the state cannot hold, much less teach, an official religion, we have allowed our schools to pay small attention to character and to devote themselves to purely mental development. We have shown a fairly idolatrous devotion to the three R's —the American educational trinity—and have passed over justice, mercy, and truth. We have whetted the intelligence of our children, but have often ignored the affections, the conscience, the imagination, and the will. Now a wave of protest is sweeping over the country, a protest that is potent because it comes from those who accept and glory in the fundamental principles of our government. What can Americans do in the face of this problem? Is the "truce of the sects" sapping the foundations of character? How can we prevent the ecclesiastical neutrality of the school from producing moral indifferentism in the pupils?

[1] An address delivered before the Twentieth Century Club, Boston, Mass., January 31, 1903.

We certainly cannot leave the education of the children of the Republic to the benevolent impulses of individuals and voluntary societies. This would mean for the mass of the people no education at all. No modern state would dream of such neglect of its own future. Hundreds of thousands of children are not under the care of any church, and would be left to grow up in ignorance. Some Christian sects are lukewarm in education, or frankly hostile to learning. Some are too poor to provide respectable schools, and all of them are weighted to-day with heavy financial burdens. Moreover, it would be as reasonable to leave all sanitary regulations, all inspection of buildings or of food and water, to spasmodic private virtue as to leave the training of the new generation to the varying impulses, slender resources, and diverse opinions of individuals and associations. Intelligence in a democracy is quite as vital as good health. In an absolute monarchy, universal education is not necessary, and may only produce popular discontent. Under a feudal constitution of society it is not necessary, since there the few may think and act for all. But the safety of the people is the supreme law, and in a democracy safety is intelligence. The functions of government are likely to be extended, not curtailed, in the next fifty years. When municipalities are providing public parks, recreation piers, free dispensaries, free libraries; when the state is regulating hours of labor, rates of transportation, the age of employees, and the conditions of healthful employment, it is not credible that either state or city will leave the most vital of all tasks to the intermittent sympathy or capricious schemes of private enterprise.

Moreover, such surrender by the state of its most important function would mean such miseducation as to result in the disintegration of society. If the time ever comes in America when each nationality shall educate in its own language, each class in society have its own class schools, and each denomination educate apart from all others, we shall be making obvious preparation for disunion and disruption. But now the school is for our immigrant population our great digestive and assimilating organ. In the fact that the

children of Augusta, Jacksonville, Galveston, and Seattle use essentially the same text-books, pursue the same methods, and breathe the same psychological atmosphere from five to fifteen years of age, lies the greatest unifying force of the nation. It is a common method of approach to life, a common political tradition, a common love of liberty and law, a common social ideal which constitute what we significantly call the common school. No combinations of capital, no union of workmen in a "labor-trust" can hold together eighty millions of people of diverse origin, scattered over a vast continent. Unity in the *Lebensanschauung*, in the attitude toward life, personal and social, must precede unity in action. If our school system disintegrates, our states will soon be "dissevered, discordant, belligerent."

It is equally clear that we cannot allow in this country any control of religious instruction by the state. The most valuable contribution of America to the modern world is our successful demonstration of the blessings of "soul-liberty." Other nations are following us, but as yet afar off. Protestant, Catholic, and Jew are here united in prizing and defending freedom of conscience as enunciated first in America by Roger Williams, and since his day established in most of our state constitutions. This freedom was not achieved in a day. It has been wrought out by three centuries of toil and conflict. With a great sum we obtained this freedom. It was not wanted by the early settlers of Virginia when they forbade the entrance of any ministers "but such as were ordained by some bishop in England." It was not permitted in Pennsylvania, which, in spite of William Penn, excluded from office all Roman Catholics, Deists, and Jews. It was not wanted in Delaware, which demanded of every office-holder a profession of faith in the doctrine of the Trinity. It was not at first permitted in New England, where the established order of Massachusetts lasted until 1833. It was achieved slowly and painfully as the logical outcome of the principles our fathers held dear, as the inevitable result of the impulses that brought them to our shores, as the result of a deeper study of political theory and of the Christian re-

ligion. By the time the Federal Union was formed the demand for freedom had become so strong and clear that in the Federal Constitution all religious tests for public office were prohibited, and the first amendment of the Constitution incorporated the result of one hundred and fifty years of struggle into the fundamental law: "Congress shall make no law respecting an establishment of religion or prohibiting the free exercise thereof." We their children must forever maintain what the fathers worked so long and hard to win. By bitter experience they learned that the support of religion by the state involves the control of religion by the state. The power that upholds is the power that governs. Massachusetts above all the other colonies invoked from the beginning the support of the secular arm; and in the early part of the nineteenth century the children of the Puritans were ejected from their houses of worship by the very enginery which they had constructed for their sure defense. Having appealed unto Cæsar, unto Cæsar they were compelled to go; with such results that no church in the commonwealth now wants anything of the government save to stand out of its sunlight.

But we have dwelt long enough in the region of negations. If we cannot allow governmental neglect of education, nor governmental oversight of religion, what can we do thru our schools for the molding of character, the training of citizens, the making of men?

We can realize and remember that all good education is education in goodness; all right training is training in doing right. Mathematics as an abstract science is not supposed to furnish special facilities for character-building. Yet the boy who goes to the blackboard to demonstrate a theorem in geometry may exhibit most of the cardinal virtues, or he may fall a victim to the seven deadly sins. His attitude toward that problem is part of his attitude toward life. If he is shifty, cowardly, evasive, superficial at the blackboard, he is preparing for shiftiness, cowardice, evasion, and superficiality in commerce, politics, or religion. We cannot select out of the boy a supposed "mind" and educate that, leaving

will and conscience untouched. It is the whole boy we work at, or nothing. If the process we put his thru is not a moral process, it is immoral and lamentable.

So in language, a slovenly and befogged nature manifests itself in a slovenly and foggy method of study, and a bad method tends to make a bad man. There is no better training in the love of accuracy, attention to detail, fineness of discrimination in shades of thought, and honesty in expression, than the old classical drill. But these things are as truly moral qualities as mental achievements.

In the most elementary study of science, loyalty to fact, patient investigation, abstinence from hasty conclusion, candor and modesty, willingness to be corrected by the larger knowledge of coming years—these things are taught at the outset of the work, and these things are the warp and woof of frank and honorable character. In manual training the learning of the difference between a joint that fits exactly and one that does not has brought many a boy face to face with the relentlessness of facts. In military drill, Kipling has memorably described the ordeal of the raw recruit as he is knocked about until he learns " to keep his rifle and himself jus' so."

But one may say: " All this instruction is only indirect." Precisely; and therefore most effective. Merely to state that some things are good and some are bad, and require students to believe the statement and recite it is surely barren dogmatism. What they need is to *feel* the goodness and beauty of some deeds, and to *feel* the debasement and defilement of others. They do not need to be furnished with a set of moral lectures. Our platitudes are generally useless, and often resented. Pupils must glow with enthusiasm in the presence of the heroic and patriotic; they must shrink instinctively from the mean and treacherous. The teaching of boys and girls must be concrete and vivid. They have no business to discuss in the grade schools the foundations of virtue. But they must see and feel the virtuous man, the hero, the statesman, the philanthropist—Washington, Webster, George Peabody. History is more than philosophy teaching

by example; it is ethics teaching without a placard. "It is," says Froude, "the voice of God forever sounding across the centuries the laws of right and wrong." To let that voice be heard, with or without the theistic inference, is the best possible moral instruction.

This indirect method, moreover, applies not only to study, but to athletics, to school organizations, and to all social intercourse. A graduate of one of our oldest colleges affirms that the greatest advantage derived from his college course was the habit of lifelong punctuality which came from being deputed to ring the college bell six times a day for four years. Every honorable athletic contest is developing the love of fair play, the spirt of fidelity to one's friends and chivalry to one's foes, the power of social coherence and co-operation, the ability to obey and to command, far more efficiently than the memorizing of any catechism could teach these things.

And in the inculcation of these fundamental requisites of life there is happily no dispute among us. Agnostic and prelate are agreed that without such virtues our society cannot endure. That righteousness tendeth to life is not and never can be sectarian instruction. Here is a vast field where no divergence of view can prevent faithful sowing and abundant harvest. Regarding the counsels of perfection we may differ widely. The virtues of the saints, the value of penitential discipline, the problems of casuistry may separate us. But concerning the virtues which are the daily bread of the moral life there is no dispute. Concerning the great industrial virtues which lie to-day at the foundation of our material progress there can be no debate. Concerning the domestic virtues which constitute the home, we are not far apart. Concerning the duties of statesmen, we usually agree. We repudiate Machiavelli, we honor Henry Wheaton, we rejoice in The Hague tribunal, without regard to religious affiliation. The sacredness of promises, the results of falsehood and treachery, the folly of deceit, the obligations of friendship, the self-contempt which follows the betrayal of trust, the social consequences of the adulteration of goods, the re-

sponsiblity of the consumer, the wrong of cheating in examinations, the self-loathing of the licentious soul, the need of courage and faith in public servants, the possibility of high ideals in politics, the results of civic pride and municipal devotion, the use of wealth in relieving distress, the duty of kindness to animals, the duty of temperance—illustrated not by charts of diseased organs, but by pictures of soldiers, statesmen, and athletes who have found temperance indispensable to efficiency—the need of thrift and economy and industry, the sure reward of promptness, accuracy, intelligence,—these are the stuff of which virtuous citizens, faithful laborers, true men and women are made; and these can be taught—these or their opposites are taught—in every school in America.

But here we are met by the assertion that clear as these duties and admirable as these virtues are, they require for their enforcement the sanctions of religion. We are told that apart from definite religious teaching the imperativeness of the moral law will never be felt, and that unless we inculcate faith in God, immortality, and a judgment to come (many would add the doctrines of the Incarnation, the inspiration of the Scriptures, and the Sacraments) our moral teaching will be merely colorless advice, powerless to sway the will or fashion the life. Hence it is claimed that our public schools must provide in some way for dogmatic instruction by ministers of religion or by teachers whom they approve. Our answer to these assertions is a frank denial, and these claims we are compelled to repudiate.

If religious dogma is to be taught in our schools, which dogma shall it be—that of Cardinal Manning or James Martineau, that of Channing or Bushnell? If theology is to precede morals, shall be the theology of the Ritualist or the Evangelical, Princeton or Andover, Meadville or Northfield? If children must be instructed in doctrine before they can be educated morally, shall it be the doctrine of Ballington Booth or Cardinal Gibbons, each of whom has an equal claim as an American citizen? If we say: "Teach only the fundamental doctrines in which the churches agree," we shall utterly fail

to satisfy the churches, and we shall have a mere residuum of belief, a creed reduced to its lowest terms, an eviscerated abstraction of religion. The points of difference among the churches are often the points which the churches most desire to have taught. Undogmatic religious teaching is a chimera.

Moreover, it is for the sake of religion itself that we object to its teaching by officers of the state. In Germany this system of state instruction in religion is carried out with characteristic vigor and rigor. About one hour a day is devoted in every school to definite religious teaching, and vast attention is paid to the preparation of the text-books and teachers. But the results are dubious. As Professor Kirchner of Berlin says: "A surfeit of religious doctrines, maxims, hymns, forms, ceremonies, prayers, as experience proves, often produces a result precisely opposite to the one intended." Such instruction may be likened to the heaping of fuel in large masses; but it leaves the soul cold and unlighted. The touch of flame must come from elsewhere. Teachers who themselves do not feel the power of religious conviction cannot be trusted to enforce such conviction on others. The children suspect their sincerity, and the teachers become hirelings. Such instruction would be in this country a hindrance to religion, especially since our conception of religion is more subjective than that of Europe. We concieve it as an experience, an attitude, a life; whereas Europe largely conceives it as a cultus, a ritual, a something to be carved in stone, or painted in fresco, dispensed or withdrawn by ecclesiastcal decree.'

We need also to remember that what is logically first may be practically last. While doctrine may be logically and theologically anterior to duty, practically children learn to do right before they can discuss the basis of right. Just as navigation is possible under the Copernican or the Ptolemaic system, so mercy and truth are possible under a defective or even a false theology. If we wait for theological unity to precede instruction in moral verity, we shall wait forever. Theoretically it is, of course, impossible to expound any sub-

ject without involving one's self in philosophy. Chemistry leads us at once to the question of the ultimate constitution of matter, and the atom and the ether are metaphysical conceptions. Astronomy was to Kepler a "thinking of God's thoughts after him." Biology conducts us at once to the problem of the origin of life, and every science is rooted in philosophy. Yet we do not teach philosophy before we teach science, but quite the reverse. Metaphysics come after physics in the education of humanity, and should come after physics in the education of the individual, who is the epitome of the race. Men who differ widely on the question of the freedom of the will may be at one in the inculcation of human duty.

If we ask why it was the duty of Admiral Dewey to sail into Manila Bay in the dusk of that May morning, we may receive several answers. There is the answer of the soldier, that it was the Admiral's duty because he had been so commanded by his superior at Washington. There is the answer of the Kantian, that the Admiral was obeying the categorical imperative and it was his not to reason why. There is the answer of the Hedonist, that after all the Admiral, like all other men, was drawn in the direction of his own greatest happiness. There is the anwer of the Utilitarian, that the Admiral was seeking the good of the greatest number. But these answers differ only in their reasons, not in their view of Dewey's duty. Men of the greatest divergence of view in philosophy and religion are agreed in the essential virtues of humanity. It is entirely possible and practicable to draw up a moral code which shall be acceptable to Edward Everett Hale, to Felix Adler, to President Patton, and to Archbishop Ireland. These men, so far apart in cosmic philosophy and theological theory, are at one concerning the "primal duties which shine aloft like stars"; and their agreement does not spring from indifference, but from the very intensity of moral passion, which will not allow the great essentials of the moral life to be obscured by the mutations of moral theory. John Milton and Thomas H. Huxley are not in all their teachings of the same mind. But when Milton writes: "I call that a

complete and generous education which enables a man to perform wisely, justly, and magnanimously all the offices both public and private, of peace and of war;" and Mr. Huxley, in his equally famous definition, pictures a man "whose passions are trained to come to heel by a vigorous will, the servant of a tender conscience; who has learned to love all beauty, whether of nature or of art, to hate all vileness, and to respect others as himself,"—we find no essential divergence as to the morally fit to survive.

If, therefore, our schools, because of religious diversity, have lapsed into moral neutrality, they must be recalled to their duty by urgent and united effort. Granted that we cannot support in them the duty of common honesty by appealing to an infallible Bible, or an infallible church, does it follow that we must neglect all the natural sanctions of morality? These natural sanctions are conspicuous, and universal, and are powerfully set forth in science, history, psychology, and literature. They are revealed on every page of modern physiology, and a college graduate recently said: "I never understood the meaning of the moral law until I studied medicine." Modern psychology has given us a powerful sanction in its exposition of the relation of will to idea; while the chapter on "Habit" in Professor James' *Psychology* has been preached from a thousand pulpits. The economic history of England and America is the best possible condemnation of child labor or of slavery. English literature will never fail in moral appeal while it contains Wordsworth's "Ode to Duty" or Lincoln's "Gettysburg Address." In no age has God left himself without witness. He has given us not only "rain and fruitful seasons"; he has given us in the great monuments of literature, in the discoveries of physical science, in the teachings of history and economics, voices that in clearest accent summon us to duty. To close the Bible is not to silence conscience. To shut the churches is not to veil the starry heavens above, or the moral law within. If there can be no effective morality apart from Christian sanctions, how comes it that the pre-Christian penitential psalms are still the best utterance of Christian confession, and

the Decalog, whose horizon is bounded by the "days in the land which the Lord thy God giveth thee," is still our Christian summary of the whole duty of man?

Indeed, all the rewards and punishments of a future state are effective in education only as they are seen to be, not arbitrary inflictions by external power, but the clear and inevitable outworking of universal law. This truth Dante perceived when he made the victims of anger in Purgatory to be plunged in blinding smoke, and the lustful to dwell amid devouring flames. To ignore the natural sanctions of morality is to make the supernatural ones incredible, while to exhibit the psychological and social sequences of character is to lay the strongest possible basis for distinctively Christian teaching.

We must, then, in this matter of moral instruction, *get together*. Protestant, Catholic, Jew, and Agnostic must insist that what they all hold as fundamental shall not be ignored. The interests at stake in the Republic are too vast for us to stand asunder. Common sense demands that we shall not spend our strength in small disputes. We must criticise by creation. No citizen may justly criticise the public schools unless he is steadily striving to make them more efficient. Any institution which represents the whole people must be the result of generous concession, hospitality to facts, and fairness of mind. To use the schools as a means of sectarian propaganda would in the end seriously damage the church thus using them. We must frankly reconcile ourselves to the fact that the decrees of the Vatican Council and the Westminster Confession can never be taught in schools supported by the taxation of the entire people. There are some Protestants who do not bewail the impossibility of inculcating the Westminster Confession, and many Catholics who hold that training in justice, reverence, honor, and truth cannot hinder, but must help, the Church in its specific work. The objection that such schools are godless applies equally well to all the institutions of the state. In the same sense the public library is godless because it does not hold morning prayers; the post-office is godless because it publishes no

creed; and the constitution is godless because it does not invoke the Christian God. Those who take this position will not be satisfied with any small concession. They will follow up one demand with another until they require the official support of their own religious faith by the government, *i. e.*, an entire union of Church and state. But this can never be in America.

We need—let us repeat it—the spirit of fairness and common sense. We do not ask for the complete secularization of the schools. This would mean a refusal to recognize religion as a fact in human life. The secularist would demand the abolition of all chaplains supported by the state, the abolition of all prayers in Congress (possibly we could survive that loss) and the erasure of " In God we trust " from every coin. Carried a little farther, this logic would demand that we cease to date public documents from the birth of Christ. It would banish from our schools the *Paradise Lost* because of its Puritan doctrine, or Whittier's lyrics because of his faith in the Eternal Goodness. But these are not the demands of intelligence. They are the utterance of the latest and smallest sectarianism.

In many schools Christmas carols are sung every December, and there are no Hebrew children to object. In a pronouncedly Hebrew neighborhood such procedure might be unwise and unjust. In most schools the King James version of the Bible is read, and there is small objection. Where offense is taken, the Douay version might be occasionally used, or the reading as an act of worship might be discontinued. These problems cannot be solved in a day. But fairness of temper, the endeavor to understand opposing views and make allowance for hereditary bias, above all the sincere desire never to coerce faith by the secular arm, will lead us step by step to a permanent solution. As a true Protestant, I want every Catholic and every Hebrew to be free from any taxation in support of my religious faith, and from every impediment to the inculcation of his own faith in the mind and heart of his own children; and I hope and believe there are multitudes of Hebrews and Roman Catholics who

would decline to tax Protestants for the support of Hebrew or Catholic teaching and worship.

But we shall fail to give the best moral instruction if we entirely banish the Bible from the public schools. The morality of Europe and America has for centuries found its chief nourishment in the library of sixty-six books that we call the Bible. Where it may be unjust to read these books as an act of public worship, it is still right and indispensable to use selections from these books as literature, and as the best possible nutriment for the moral nature. A crude theory of inspiration, or a peculiar reverence for tradition, has hitherto hindered us from using the Bible as it was used in the first three centuries, in separate portions, and has compelled us, if we would give children the Sermon on the Mount, or the Twenty-third Psalm, to spread before them also the slaughters of the Canaanites, and those chapters of Paul which Peter found "hard to be understood." But every school in Germany has its book of selections from the Bible to be used in moral instruction, and every school in the United States should have the same thing. There is no material for character building like the biographies of the Old Testament, the Psalms in the old Hebrew hymn book, the pithy proverbs of the wise men of Israel, the splendid survey of creation in the book of Job, the parables of Jesus, or Paul's praise of love in the first letter to the church in Corinth. It is incredible that the children in every high school should be made familiar with the pranks of pagan deities, and the dubious moralities of Olympus, and yet be forbidden to read the Sermon on the Mount because it happens to be printed in a book which Christians revere. The Bible, or, rather, such portions of it as deal with fundamental morality, must come back into the public school. It must not be smuggled in stealthily at the back door; it must come in at the front door, and be received with at least as much honor as the *Æneid* or the *Iliad*. How long will we as a people endure a situation which requires the reading of Ovid and forbids the reading of the Fifty-first Psalm? How long will we require full exposition of the religion of Greece and Rome, and forbid

any allusion to the Bible, on the ground that it is part of the religion of America? Granted that we cannot and should not use the Bible in any public school as a rule of faith and practice, it does not follow that we can use no part of it as the food of character. If we can draw moral teaching from the lives of Napoleon and Bismarck, we surely can draw it from the stories of David and Samuel. If we use the maxims of Epictetus and Lord Chesterfield, we can surely find some help in the proverbs of Solomon. We ask that the public schools shall not in their hypersensitiveness discriminate against the Bible, and make it the only book in the world which is excluded by law from the education of our children. If a clergyman enters a public school he goes there not as a minister of religion, but as a citizen. When the Bible, or some portion of it, enters the public school, in any version the people may desire, it comes not as a supernatural revelation, but as the essential nutriment of character—a book dear to Jefferson and Franklin and Lincoln as well as to Horace Bushnell and Phillips Brooks. If Christians consent, out of fatuous fastidiousness, to banish all parts of the Christian Scriptures from the public school, they will probably live to see them brought back again by the disciples of Herbert Spencer and Frederick Harrison. Whatever literature is lofty in its ethics, and noble in its simplicity, whether written in Persia, Palestine, or Athens, is useful for the making of men; and such literature is none the worse if it came from the martyrs, apostles, and prophets of the Christian faith.

We need also to devote more time and thought than have hitherto been given to the question of the preparation and use of text-books in elementary ethics. Such books are often disparaged by those who are weary of text-books in general, or who fear that these books involve the infliction of ethical theory on young children. For the earlier grades the teacher is indeed the best possible text-book. The power of a generous, upright, candid soul is greater than that of all printed codes or admonitions. By oral instruction and example the youngest children can best learn their duties to one another,

to parents, to city, and to native land. But the experiments made in France during the last twenty years to provide a series of text-books for the teaching of elementary morals deserve our serious study.[2] Many of the leaders of French thought have deemed the preparation of such books a worthy task. Paul Janet, Henry Greville, G. Compayré, and Jules Simon have bent their energies to this work. The result is a considerable number of books of varying quality, but used thruout the country, and a large amount of time in every school actually given to the consideration of personal and social duty.

It is interesting to note that Japan is vigorously prescribing the same kind of instruction in its own public schools. The present minister of instruction, Dr Kikuchi, has carefully outlined a graded course of teaching in the primal duties of man, which, as reported by Professor E. W. Clement of Tokyo, is of great interest. "The first and second year students are to be instructed in such subjects as Duties of students as such, Personal health, The spirit in which to take up studies, Conduct toward others, Every day life, Life at home, Conduct toward the state . . . The third and fourth year students are to be instructed in . . . Personal standing of others; Life, property, and reputation of others; Secrets, promises, etc., Duties to benefactors, friends, the young and the old, the high and the low, master and servant, the female sex." It is easy, of course, to predict that such instruction will produce a crop of infantile casuists and prigs. But somewhere and somehow children must be taught to think of the moral quality of action, and such teaching deserves a place in the public school. Gradually, amid many blunders, we shall find a way to secure this, and to make it effective.

But above all we can insist that the home and the church shall not attempt to shift upon the school their own responsibility for moral training. The school will surely break down if it is compelled to assume the work of the home and the church, and is held responsible for all the evils that afflict

[2] EDUCATIONAL REVIEW, April, 1902. *Moral and religious instruction in France*, by Jean Charlemagne Bracq.

society. In this connection we are happy to quote Rev. Thomas Bouquillon, D. D., formerly Professor of Moral Theology at the Catholic University of America, in Washington: "Education: to whom does it belong? . . . It belongs to the individual—physical or moral—to the family, to the state, to the church; to none of these solely and exclusively, but to all four combined in harmonious working, for the reason that man is not an isolated, but a social, being." This truly Catholic utterance we heartily indorse. When disorganized homes and anæmic churches leave the training of children to the public schools, the burden is too great to be borne. A serious decline in American home life has been caused by the inroads of luxury, the impulse to wander over the earth in search of perpetual spring, and the adoption of a daily household program for parents in which the children cannot share. When the family spend four months of the year at great winter caravansaries, and most of the summer amid the whirl of fashionable shore resorts, the mental and moral education of children is not easy. Where "luxury and alimony" are the rule, the rearing of offspring seems an impediment to legitimate enjoyment, and the responsibility for their training is eagerly relegated to private and public schools, which are no substitute for the Christian home.

The school can never replace the church in its pastoral sympathy, its eternal sanctions, or its molding power. It can never replace the home in its early opportunity, its continuous pressure, its tenderness and affection. The state, the home, the church, the school—this is the great quadrilateral of powers that can together give long life to humanity, and establish the kingdom of truth on earth. Each must co-operate with all the others in transmuting knowledge into character, in training men and women who shall be leaders of their generation in truth and righteousness.

W. H. P. Faunce

Brown University,
Providence, R. I.

II

DIFFERENTIATION IN THE HIGHER EDUCATION OF WOMEN

Among the surprising educational results of the last fifty years is the fact that numerically, at least, women have become the chief bearers of culture. In the American high school there are about three young women to every young man, most of them devoting their time mainly to languages. In the colleges and universities women are fast coming to equal men in numbers, and far to surpass them in devotion to English, French, German, Latin, Greek, and history. So striking is this fact in some portions of the United States that one university at least has limited the number of women it will receive, while another hopes to prevent what it calls the feminization of its arts courses by the segregation of women students. Parallel with this rapid increase in the number of women devoting themselves almost exclusively to the humanities we have a correspondingly rapid increase in the number of young men who are devoting themselves to the applied arts and sciences. Should higher education for men devote all its attention to the humanities and the pure sciences, it would soon produce in this country an educated proletariat more notable than that which Bismarck attributed to Germany.

The effects of the differentiation of men's education and the corresponding lack of differentiation in women's education, together with the rapid increase in the number of women going to higher institutions of learning, are likely to be seen in a number of ways. For instance, if women flock in increasing numbers to the universities, as they are sure to do, and continue to make languages and allied subjects their chief occupation, as under present circumstances they are likely to do, and if the education of men continues to

differentiate, the A. B. degree will go to all college women, and to the few men only who expect to teach the humanities or who pursue them for society purposes. In other words, it will become substantially a woman's degree. This may perhaps be well, but it will also be new.

In the next place, the high school is coming more and more under the influence of woman teachers, and, what is of more consequence, it is coming more and more under the influence of those subjective ideals of life and education that arise from exclusive devotion to literary subjects. It is not so much what high school lads study that engrosses their minds and holds them in school as the spirit in which these branches are taught. Restless, ambitious young men will incline to exchange as soon as possible an atmosphere of subjectivity and of sentiment, however noble, for one of stirring and vigorous activity. It is real situations that hold their interest and command their respect. It is possible for the school to create just such an atmosphere when women are the teachers, but hardly when the teachers are women of only one type of education, and that type largely subjective. It may be surprising to hear the opinion expressed that the exclusive devotion of teachers to what is regarded by many as the best form of education can hurt the high school, but is it not conceivable that one form of training, like one article of diet, however excellent, may fail to produce the best results?

Again, when women go exclusively into the arts courses at college, they enter into too sharp a competition with one another in the chief gainful occupation they are prepared to follow; namely, teaching. Many a high-school woman teacher is being displaced by her own pupils who have gone thru college, and who are willing to teach for half the salary the older teacher is receiving. An instance is told of a displaced teacher whose salary was taken to pay the three young college women who were employed in her stead.

The American university is, for men, a cross between the English system, which confines higher education to general culture, and the German system, which confines it substantially to professional training. President Hadley expresses the

opinion that the combination of the two systems is better than either of the others alone. Yet many complaints are uttered that tho the two are in juxtaposition they are not united, since the professional students do not as a rule pursue the arts courses to an adequate extent. This objection, however, does not remove the fact that higher education for men is widely differentiated in the American university because of its professional schools. Even the arts course is made professional by men who are preparing to be teachers.

For women, however, the English system holds almost absolutely. One young woman in Cornell is now studying five languages, while scarcely any women students ever stray beyond the purely culture courses. Occasionally one is found in law or architecture, while a few study medicine; but these are exceptions. For woman as a whole the modern higher education offers no such wealth of opportunity outside the languages and pure sciences as is provided for men. It may be freely granted that it was at first enough for women to compete with men in one department alone, but surely the advocates of equal opportunity for men and women can not rest satisfied with one type of education for women while many types are freely offered to men.

In general, it may be said that those occupations of women as of men which promote worthy personal or social welfare and which rest upon the bodies of pure arts and sciences that constitute the culture courses are worthy of professional study.

Whether women should in the university carry over the study of the pure arts and sciences into the applied arts and sciences may perhaps be a debatable question. However, even if the function of women were limited to the rearing of children, the arguments of Herbert Spencer for a knowledge of applied science, tho formulated over forty years ago, have not lost their validity. But there are many other forms of activity for women, for many of which professional training would be an advantage. These may pertain to the home and family, to gainful occupations, or to the larger social service. Some women want to earn a livelihood, most women are

vitally interested in the thrift, comfort, and health of the family, while all women would, if they knew how, contribute to the welfare of the community of which they are members and the country of which they are citizens.

In the first place, why should the fine arts taught in the university remain in their museum stage? Why should they not be used for enhancing personal adornment in dress, for the artistic decoration of the home, for landscape gardening, for increasing the value of factory products; in short, why should they not be reflected in private life, and form the sure basis for artistic improvement in manufacture?

Again, why should occupation in the applied arts be limited to persons who base their artistic training upon elementary education? These callings need the intelligent guidance that can come alone from the highest artistic training, for rule of thumb in applied fine arts is no more excellent than it is in engineering. Many women have taste and ability for commercial enterprises. Shall the measure of their possible preparation for such work be the brief and inadequate training afforded even by the best of our secondary schools of commerce? Is her field to be circumscribed to stenography and bookkeeping? Ought not the university to extend to her, and to men also, a professional training in the applications of science, language, and economics to this realm of human endeavor? Not a few bread-winning occupations depend upon a skillful application of the natural sciences. This has long been true with men. Examples may readily be cited. A young man who graduated ten years ago from Swarthmore College in the science course is now receiving a salary of twelve thousand dollars a year because he is an expert in applied chemistry. A New England college woman who had studied and taught chemistry concluded to make a business application of her knowledge. She studied the art of bread-making, and when this had been mastered, she set up a scientific bakery in her own town. Soon the fame of her bread spread to the neighboring city of Cambridge, whither she soon removed her establishment. The demand for her product soon taxed her power to produce. Her bread now goes to Boston,

and she is invited to establish similar bakeries in neighboring cities. Almost every domestic art has like possibilities, and awaits alike the transforming hand of applied science.

Not all professional knowledge needs to be turned to personal financial account. Much of this knowledge is of the greatest social value. One who understands from scientific study the chemistry and the adulteration of foods can render the highest social service to the communtiy, for she can lift that community to a distinctly higher plane of living. One who has mastered the applied science of hygiene is in a similar position, both as regards her family and the neighborhood in which she lives. Her knowledge will apply to water-supply, drainage, plumbing, the sanitary condition of schools, and the care of the sick. Thru such enlightened intelligence human life will be rendered happier and longer.

Every applied art or science has had its period of struggle for university recognition. Once nobody thought there was anything to teach in agriculture. Thirty years ago it was hard to find a position for a young man trained in an engineering school; many still think there is nothing to do for a teacher but to teach him his subject-matter. The professions of law, medicine, and theology are older and better established, as regards the need of professional training, yet many can remember when it was thought sufficient for the young man to study in a lawyer's or a doctor's office. The opposition that professional training for men has encountered will naturally be met with in the case of women, but the triumphant vindication of the one awaits the efforts of the other.

Once all applied arts were learned by imitation thru apprenticeship; now the leaders of all great occupations need professional training in institutions of higher learning. The same is true of women. The occupations that now engross them or to which they might profitably turn their attention are at present learned empirically.

Among the branches of applied arts and sciences for women that the university might provide for, the following are suggested:

1. Interior decoration as a branch of architecture.

2. Artistic design as a basis for dressmaking, tailoring, millinery, lace making, textile industries, and the like.

3. Painting, modeling, and wood carving.

4. Music, vocal and instrumental, based on a broad, liberal culture in language, history of art, mathematics, and the like.

5. Domestic science, including the chemistry of foods and household economy.

6. Commercial science, as based upon natural science, economics, history, ethnology, and language.

7. Hygiene, personal, house and public, as based upon physiology and bacteriology, and the sciences of sanitation.[1]

All of the courses here mentioned are represented in institutions of secondary grade, but they need to be elevated to the rank of university professional instruction. Many of these proficiencies may easily lead to artistic callings having the possibilities of large financial returns, and all of them, without exception, are capable of greatly enhancing the comfort and value of life. Intimately and firmly united as they are to the pure arts and sciences that constitute the subject-matter of culture, they form a more perfect blending of English and German systems in the higher education for women than does the present state of academic and professional training for men.

Is it after all worth doing? Is not teaching, being in the popular view a prelude to marriage, the only suitable profession for a woman? Is not general culture alone best for women who marry, as well as for those who do not? Will not culture perish unless all college women devote themselves to it? Would it not be lowering to womanhood to study the applied arts and sciences?

In the first place, all such courses would in the nature of the case be elective, so that no one would be required to study distasteful subjects. In the next place, teaching is not a prelude to marriage; it is rather the novitiate to a new sisterhood. Probably not twenty-five per cent. of the college women who go into teaching ever marry; and it is certain

[1] Compare the new courses in household economics at Brown University.

that not ten per cent. of those who spend their lives in the schoolroom ever obtain money enough to secure in abundance the ordinary comforts of life. Whoever heard of a woman buying a house with her own earnings as a teacher? This woeful condition is made permanent by the fact that college women who want to earn their own living are professionally prepared for teaching alone. Again, culture is not in danger of extinction. The ever improving high school will save it to the masses, while professional scholars will transmit it to future generations.

Some may oppose courses for women on the ground that sex should not be recognized in education. But under present conditions it is most emphatically recognized, since the higher education of men is outstripping a hundredfold that of women in variety and practical usefulness. Do the leaders of women's education desire to make women more independent respecting gainful occupation? The reply is that higher education does not at present have this effect, since it prepares them professionally for teaching alone, thereby making it impossible except in the rare cases where legislation fixes wages for any to gain a real competence. Is the aim of woman's higher education to raise to the highest degree her usefulness in the community? Even this noble purpose is now but partially realized. Poetry is good as far as it goes, but it does not combat microbes or adorn houses or render much real social service. Let us have poetry and languages, and fine arts, and pure sciences by all means. They are the indispensable basis of the best application of human knowledge to human affairs. But we should not stop with their bare acquisition, but should rather carry them on in professional training until there is that perfect blending of the theoretrical and the practical which leads to a harmonious union of learning and life.

CHARLES DE GARMO

CORNELL UNIVERSITY,
ITHACA, N. Y.

III

CIVIL-SERVICE REFORM PRINCIPLES IN EDUCATION[1]

It is a well-known truth that the most conservative of institutions are those thru which the processes of education are accomplished. Education clings to the old and reverences the past; it is guided by tradition and governed by precedent. It is on its guard against the adoption of new ideas and the acceptance of novel theories, and it has ever been a follower rather than a leader. This condition would be surprising were not an explanation for it readily found in the long domination of the educational system by that even more conservative influence, the Church. For centuries the Church led and education followed.

This conservatism has not been changed by the partial substitution of civil for ecclesiastical control; it is now the state instead of the Church that leads, while education still follows. The condition is well described by Mr. E. J. Lowell when he says of the political system: "It is characteristic of the European family of nations, as distinguished from the other great divisions of mankind, that among them different ideals of government and of life arise from time to time, and that before the whole of a community has entirely adopted one set of principles the more advanced thinkers are already passing on to another."[2]

If this principle is applied to the relative position of the state and education, it must follow that the starting-point of the statesman becomes the goal of the educator. Hence the educational system constantly suffers from the employment of antiquated political methods that have never represented our highest ideals, and from attempts to employ prin-

[1] A paper read at the annual meeting of National Civil-Service Reform League, Philadelphia, Pa., December, 1902.

[2] *Eve of the French revolution*, p. 1.

ciples not in harmony with the generally accepted ideas of the best form of political government. Illustrations of the slower pace in which education follows in the footsteps of the state are seen in the survival of denominational schools long after the separation of Church and state, in the adoption and retention of the monarchical principle in educational organization long after its abandonment in the political world, and in the educational disfranchisement of all officers of instruction so far as regards the choice of their superior officers.

It is therefore not surprising that it was long after the evil of the spoils theory was introduced into the body politic before its corrupting effects were noticeable in the educational system. But once introduced it has spread with great rapidity, until its extent is perhaps not realized by those whose activities have been given to checking its growth in political life.

The organization of educational work has lent itself readily to this rapid development of the spoils evil. In the absence of a national educational system the states have governed their educational affairs in their own way. Politicians and well-meaning philanthropists have thus often been able to control the general situation to the extent of requiring the teaching of certain subjects, like American History, in the interests of patriotism,[3] or prescribing that certain definite tenets should be taught, such as the injurious effects of alcoholic drinks, the benefits of protective tariff, and the virtues of bimetalism. In the choice of State superintendents of public instruction politics rather than merit has sometimes been considered,[4] while the adoption of uniform text-books published by the state opens up unlimited possibilities for corruption.

But the stronghold of the politician is in the local admin-

[3] It is interesting to see the insistence on this idea in the smaller states. The State Legislature of Nevada, for example, instructs its teachers "to kindle the fires of patriotism."

[4] Some years since a State superintendent of public instruction was elected by a State Legislature and some of the daily papers of the State congratulated the public on the ideal choice made, since the person elected had always served faithfully the cause of the Republican party.

istration of the public schools in towns and cities. In these places the management and control of public educational affairs is in the hands of two distinct bodies—the board of education and the superintendent. Of these two the more important is the board of education. What are its functions? They may be classed under three heads. The most obvious are the business duties or those that concern the educational plant. These include the purchase of school sites, the construction and repair of buildings, the decision in regard to methods of heating, lighting, ventilation, and sanitary equipment, all of these duties carrying with them the letting of large numbers of important contracts.

A second class concerns the material equipment of the schools. This comprises the purchase of school furniture, necessary apparatus, libraries, decorative material, stationery and similar supplies, and the selection and payment of janitors, watchmen, and other caretakers.

A third class is connected with the specific field of education. This includes the selection and appointment of superintendents, principals, and teachers; the decision in regard to the establishment of technical schools, commercial schools, evening schools, training schools for teachers, general industrial and mechanical training, courses of public lectures, university extension and similar educational activities, the choice of text-books, and finally the general questions connected with the curriculum.

In view of these manifold activities it is important to inquire how the members of the boards of education receive their office. Three general types of school boards are found. The oldest of these is a numerous body, made up of members representing the various wards of the city and residing in them. Election to the school board of this pattern is sought by political aspirants, who reason that, judging by the past, the school board is the first round in the political ladder that stretches from the street to the presidency. The temptations, therefore, are manifold to purchase for school sites property that may be ill adapted for school purposes,[5] but

[5] In one city the high school is located on the top of a high hill difficult to be

property that a brother politician desires to sell, to appoint for the construction of school buildings a local architect who builds dwelling-houses, churches, courthouses, banks, opera houses, and school buildings with equal lack of appreciation of the different uses each building is to serve; to let contracts for the purchase of supplies to those whose political support is sought; to decide in favor of the establishment of a training school for city teachers, not so much from a desire to have better trained teachers as from a wish to keep at home young men and women who may be centers of political influence.

It is school boards thus elected who have ruled that only residents of a city may occupy positions in the schools; that only one member of a family may be appointed, and that married women may not be appointed, because, if married, presumably they do not need the salary. It is school boards so chosen that refuse to raise the salaries of teachers on the ground that members of the same family have already had their salaries increased; that in some localities give positions in the schools to the lowest bidder, and in others to those who contribute most generously to the campaign funds of the dominant political party; that promote teachers on the principle of priority of appointment, irrespective of their qualifications for the advanced position, and, conversely, cut off the last teacher to be appointed, no matter how successful he may have been, if a reduction in the teaching force is necessary; that appoint young women to important positions with the object of retaining the political support of the families they represent;[6] that give places to young men for the sole reason that they have a political "pull";[7] that install as

reached on foot, while street-car lines pass on two sides of it, and the resulting noise is almost intolerable.

[6] A few years ago one of the district Tammany leaders had secured positions in the public schools of New York city for four sisters of one of his political subordinates. When the subordinate at one time refused to follow his leader, charges of the basest ingratitude were preferred against him by all the members of the Tammany camp.

[7] In one of our large city high schools, a department of biology was recently established. Among the candidates for the position of head of the department was a young man of small education, who had made a failure as a lawyer, and a young woman, a college graduate, who had made a special study of biology. The broken-down lawyer was "in" with the powers in control and received the

principals of schools men who murder the King's English, and that remove teachers who are unwilling to serve the personal ends of its members;[8] that furnish the schools with geographies twenty-five years old and with text-books on science written twenty years ago; that purchase stereopticons without lantern slides and that contract for chromos by the score to be used as wall decorations.[9]

It is in connection with school boards of this type—elected by and from the wards as their representatives—that the worst scandals in the administration of the public schools have arisen. Their attitude toward their duties is perhaps illustrated by a recent session of a school board where a member said with pride that he was not an educator in any way, shape, manner, or form whatever, and that if the people elected him on that supposition, they made a great mistake.[10]

The manifold evils of the method of electing school trustees in this manner may well be summed up in the words of a citizens' committee that has for many years been attempting, as yet ineffectually, to free one of our great cities from the grip of the spoilsmen. Where the ward system prevails, the committee reports: "The natural tendency is for the holders of places on the board to be governed by considerations of ward politics rather than by the interests of the schools at large. This is not theory; at present janitorships are traded off, and even principalships of schools in certain

appointment. Public opinion and the attitude of the students soon compelled his resignation and the young woman with some knowledge of the subject ultimately received the appointment.

[8] One teacher has recently been compelled to resign because she refused to use her influence to secure a railway pass for the president of the board from her uncle, the president of one of the great trunk lines.

[9] A few years since I visited the public schools of a large city that numbered among its civic associations one for the encouragement of art. This association had a large and invaluable collection of prints illustrating literary and historical subjects. Each one was tastefully framed in passe-partout and bore in print a full explanatory description of the scene, locality, event, building, or person represented. These pictures were loaned to the different public schools and were changed every three months. The week I visited the schools these, by the authority of the school board, were being replaced by hundreds of cheap, meaningless pictures, gaudily framed, that had apparently been purchased by the wholesale.

[10] *Proceedings of the National Educational Association*, 1900, p. 618.

wards are regarded as the perquisites of representatives of such wards. Buildings are secured for wards by members having the greatest 'pull,' and other districts are deprived of schools regardless of the needs of such districts. The whole school management becomes a system of trading of ward interests. The school district should be a unit if economical and systematic arrangement is to be possible."

The stream cannot rise higher than its source, and if school boards are elected for political or partisan reasons, superintendents and teachers will be elected on similar grounds; teachers will come to regard their occupation as a trade, not as a profession;[11] educational funds will be mismanaged, inferior school equipment will be supplied, and the educational results will be far from commensurate with the expenditures made. The ultimate result of this degeneration has been the establishment of private schools supported by the wealthy classes, who have paid from one pocket heavy fees for the education of their children, and from the other pocket still heavier tolls to the political highwaymen who have used the school funds to secure their own political preferment or personal advancement.

An awakening appreciation of the impossibility of having an efficient administration of the schools as long as their control is in the hands of a numerous body elected on a partisan ticket has led, in some places, to the substitution for it of a small body elected on a general ticket or appointed by the mayor. Experience has seemed to show that if governing bodies are so selected or appointed there is less danger of jobbery and log-rolling in the administration of the schools on their financial side, and that teachers will be less likely to be appointed for reasons of political influence, religious affiliations, family connection, personal popularity, or a desire to

[11] The Chicago Teachers' Federation recently voted to enter the ranks of the trades union and to ask admission to the Chicago Federation of Labor.—*Literary Digest*, November 22, 1902.

In New York city, the Central Federated Union voted December 21 to attempt to organize the public-school teachers of the city, and directed its organization committee to call a meeting of the public-school teachers for the purpose.—*The Tribune*, December 22, 1902.

protect home industries, than on account of character, scholarship, professional training, and teaching ability.

So much is the political control of the schools to be deplored that it would seem as if every community would be on its guard against the insidious rule and use all means possible to avert such an unfortunate condition; but the general apathy that characterizes nearly every town in the administration of its local political affairs is still more in evidence in the administration of its educational work. So little has as yet been accomplished to rid the schools of political influence that we seem not yet to have reached the parting of the ways. The superintendent of schools in one of our great inland cities has recently written: "I have yet to find the city where political influence does not, to a greater or less extent, find its way into the school department"; and his words would doubtless be echoed by large numbers of his fellow superintendents.

It is a matter of great congratulation that the principles of civil-service reform have taken such deep root that few are found who openly call in question their wisdom and efficiency. In the forty years that have intervened since Mr. Jenckes began his heroic struggle in the House of Representatives for the substitution of the merit system for the spoils system in the political field, enormous progress has been made and political parties now vie with each other in protestations of attachment to the cause of civil-service reform. But it must be said that the victories have as yet been largely within the domain of politics. The spoilsmen have been driven from the great departments of public administration in Washington and from State and municipal strongholds only to redouble their assaults on the public school system. While men have slept the enemy has sown tares!

That this should be the case has been but natural. The evils of the spoils system, as found in the national government, are far more patent than is their manifestation elsewhere, because of the great publicity that attends all presidential and cabinet appointments. Yet the opportunities offered the spoilsmen are in the aggregate far greater in the

educational than in the political field. The total number of teachers approximates 500,000, while the total number of civil officers is less than one-half as many.

Mr. George William Curtis said, in an address delivered in 1891 before the National Educational Association: "The alphabet is the ally of liberty, and in any accurate account of the forces that have made America the public school must stand first." But the public school, if it is to fulfill the sanguine expectations of those who would predicate Mr. Curtis' words of the future, rather than as yet of the past, must have an ally. The great masses of those connected with it are not only powerless to accomplish reform, but they fall an easy prey to the assaults of enemies. The public school is inert, it lacks initiative, it is a follower, not a leader. All the more important, therefore, is it that the leadership should be wise, capable, and disinterested.

Is it too much to hope that this body of influential men, who have already accomplished so much in wresting the civil service from the clutch of the grasping politician, will turn its attention to the public school and make it indeed—to adapt the words of Mr. Curtis—the great force that lies behind the ideal America? Such effort must be doubly repaid in the building up of a great constituency imbued with high ideals of public service.

When a reform in the civil service was agitated in England Sir James Stephen said that a moral revolution was necessary in that country before the reform could become an accomplished fact. Could the educational system be freed from the curse of the spoils evil, and could the youth of the land be taught by example and daily conduct, as well as by precept, the higher ideals of public life, the moral revolution that would result would turn the ideals of the National Civil Service Reform League into accomplished facts.

LUCY M. SALMON

VASSAR COLLEGE,
POUGHKEEPSIE, N. Y.

IV

PUBLIC ELEMENTARY SCHOOLS OF ROME

Of the remarkable progress in education during the last quarter of the past century, the features which have attracted most attention are, perhaps, the rapid development of Board Schools in the English cities, the reforms in secondary education in Germany, and the great expansion of the universities in the United States. Less noted, but not less far-reaching in results, is the movement in the direction of popular education which has occurred during the same period in Italy. Amid a (thoroly Catholic) population and under the shadow of the Vatican, has been developed a system of purely secular education entirely free from the compromises which constitute so perplexingly a problem for English parliaments. Illiteracy, which existed in appalling proportions, is being rapidly reduced, and a population consisting of the most diverse elements and possessing intense local prejudice is becoming gradually unified. Because of a centralized authority and an enlightened policy, reforms, which elsewhere are gained only by a slow evolution, are introduced with remarkable rapidity and efficiency; an example of this is seen in the widespread adoption of courses in agriculture and manual training.

It is the purpose of this brief article, however, not to enter upon a general discussion of education in Italy or to summarize its history and statistics,—which is excellently done in the reports of the United States Bureau of Education, especially in the volumes for 1893-94, 1894-95 and 1898-99,—but to supplement these reports by some concrete illustrations gathered in a visit to several of the elementary schools in the capital city.

Since Rome is looked upon as an ancient rather than a modern city, it is somewhat of a surprise to the visitor to

find this city in advance of other great capitals of Europe, notably Berlin and Vienna, in the character of its school buildings, in the sanitary conditions and in the course of study: to find, in a word, that Rome has public schools of the most modern type.

The newer buildings are admirably planned to secure good lighting and freedom from the noises of the street. The quiet, which in Berlin is secured by placing the buildings in rear lots in the center of a city block, is here obtained by running corridors along the front of the building and placing the classrooms in the rear overlooking the play-grounds. Double spiral stairways, occupying no more space than is usually required for a single stairway, afford facilities for the simultaneous entrance and exit of classes without interference. Baths, workshops, and gymnasiums are provided. The play-grounds are in the rear of the buildings, the wings of which break up the space in such a way that isolated grounds are secured for the kindergarten and other divisions of the school. Fish ponds and gardens add to the attractiveness of the surroundings and afford opportunity for nature study. In New York, roof gardens are a substitute for play-grounds; in Rome, not only is additional play space secured in this way, but even the means for a liberal education.

From the roof garden of the Vittorino da Feltre school on the Via Colosseum one directly overlooks the Colosseum, the Arch of Constantine, the Forum, the Capitol, the Palatine Hill and the Alban Mountains—Rome, primitive, republican, imperial, Christian, and mediæval. In the skillful utilization of location, in economy of space and in architectural refinement, the building just mentioned is noteworthy.

The classrooms are well lighted and, tho plain, are attractive. There is not the severe simplicity of the German schools, nor, on the other hand, the profusion of charts, pictures and pupils' work displayed in the schools of Antwerp and Brussels. A crucifix above the teacher's platform, a small blackboard, one or two pictures or maps of ancient or modern Rome, a class library, and a few specimens of pupils'

work are the usual features. Tho the municipality is poor and the taxes extremely high, no necessary expense seems to be spared in securing the best sanitary conditions and appropriate medical supervision. Thru lack of funds the best building in Vienna, that at Floridsdorf, is not kept in repair and its baths are unused, because of inadequate heating. In Berlin one may see, in the municipal pedagogical museum, samples of adjustable desks, and upon inquiry may learn that they were too expensive for use; in far less wealthy Rome one may see such desks in use. The manner of adjustment seems peculiar to one accustomed to the American school furniture; the desk and chair are fixed, the platform is movable.

The supply of drinking water corresponds to the plan recently adopted by the board of education of Chicago; water is drunk directly from fountains without the use of cups. To avoid communication of diseases of the skin and of the eye each child has his individual towel. There is also, as in New York, a daily medical examination. Not only is attention given to the prevention of disease, but all available means are employed to further the physical and moral welfare of the children. A society for the care of poor children, which originated in connection with the Pestalozzi school on the Via Montebello, has extended its operations to other municipal schools. Food and clothing are supplied to the needy, many are sent to the country in the summer, and homes are provided for the destitute.

The work of the school itself is not limited to the hours of the session, from nine to three; in an open school building an attempt is made to find a substitute for the influences of the street and to provide a home for those children whose parents are at work during the entire day. The children who remain after regular hours are under the supervision of a teacher and are allowed to play, to do manual work, to use the class libraries, or to study. On Sundays the teachers give popular lectures, frequently illustrated by means of a stereopticon, and particularly dealing with the art and history of Rome.

In the organization of a school, the sexes are separated and are placed in different wings of the building, with a principal for each side. The girls are taught by women and the boys by men, with the exception that the boys of the lowest grades may be taught by women. There are from fifty to sixty children in a class. The ages range from six to twelve, the compulsory period being from six to nine. The teachers are refined, gentle in manner, and apparently well equipped for their work; a normal training is required. No effort seems necessary in order to maintain discipline. The children are orderly and earnest. All wear large aprons with sleeves, one color for the boys, another for the girls; the number of stripes on the apron indicates the grade of the child, and in many cases the name or initials are added. The wearing of the apron is not a sign of an inferior class, as is the case in France and Belgium; but, besides being conducive to neatness and cleanliness, it serves in obliterating in the elementary school all distinction of class and dress, as is claimed for use of the academic gown in higher institutions in the United States.

In the incorporation of the kindergarten in the public school system, Rome is in advance of other European capitals. There are, in addition to a training class for teachers, forty kindergartens under municipal control. The age of admission is from three to six. The hours of session are from nine to two. As the children are seated at desks instead of at tables, as in America, the rooms have the appearance of ordinary classrooms. Slates ruled in squares are used for drawing lessons on the geometric plan proposed by Froebel. All the occupations follow closely the traditional methods, with a consequent disregard of the strain upon eyes and muscles involved in the needlework. Outside the classroom, however, there is evidence of more freedom; gardens planted by the children and fish ponds afford opportunity for activity and for nature study. A visit to the training class for kindergarten teachers throws some light upon the extreme formality noticed in the work with the little children. A large proportion of the time is given to paper folding, pricking,

and to Froebel's method of drawing; and no instruction is given in psychology and the history of education.

The course of study in elementary schools is divided into a lower course of three years and a higher course of two years, the lower course fulfilling the requirements of the law for compulsory education. With the exception of manual training, a subject of recent introduction, the program of studies and the method of teaching are still mainly determined by the decree of 1894.

In arithmetic, oral exercises in the four operations as far as 20, and in numeration to 100 are prescribed for the first year's work. During the second year, the four rules are taught orally to 100, written to 1000, and applied to the solution of easy problems. Common fractions, decimals, the metric system, and the drawing and definition of simple geometric figures are introduced in the third year. The two higher classes study the mensuration of plane and solid geometrical bodies; measures of volume, weight, and value; proportion and percentage, with their applications to practical—mainly commercial—problems. The course is simple, logical, and practical; it relates drawing, number, and elementary notions of geometry, and aims at application. It is required that arithmetic be taught in a practical manner and that an unhesitating facility in the use of the four rules be secured. Whether due to the plan of the course, or to the amount of drill and oral work, or to the precocity of the children, the results in arithmetic in Roman schools seem to be in advance of those generally secured in the corresponding grades in America, particularly in rapid and accurate analysis and in the solution of problems.

Object lessons are given thruout the lower course, that is the first three years. They include common objects of the home and school, the parts of the body, division of time, the seasons, foods, animals, arts, industries, inventions, communication, and transportation.

In the teaching of language and reading, precision in the use of both spoken and written language is a primary aim; to secure this, great stress is laid upon imitation, dictation, and

committing to memory. Grammatical study begins with the conjugation of the verb in the third year. Penmanship, *Calligrafia*, as it is called (and it is really beautiful writing which one sees in the copybook, note books, and exercises of the children), is taught partly in connection with language, as in dictation exercises, and partly by means of copybooks ruled with many space and slant guide lines.

In the study of history and geography the Roman schools occupy a unique position; the problems of correlation and of the unification of the local and the general, the modern and the classical, here vanish. Both subjects begin with the home, advance in the second year to a view of Europe and the world, and return again to a more detailed examination of Italy and Rome in the third year. These subjects are introduced in the third grade by the study of the cardinal points, the surroundings of the school, the topography of the city, the provinces of Italy, and the Italian "*resurrection.*" In the fourth grade are studied the story of the foundation of Rome and the history of the republic, of the empire, and of the mediæval period; the geography of Europe, and the world. The work of the fifth grade takes up again in a more detailed manner the geography of Italy and the history of the modern national period. The aim is the cultivation of an appreciation of the value of united Italy and of the obligations to the city and the nation. The method of treatment involves a discussion of duties to the family, society, and the state.

Religious instruction is given only upon request of the parents, and outside of school hours. Morals are taught by example and in connection with other studies, particularly history.

In accordance with the policy of the Minister of Education, "for each rural school a field, for each urban school the experimental workshop, and for females training in female occupation and domestic economy," manual training courses are provided for both boys and girls. The boys have work in wood, cardboard, and bookbinding. Articles useful in the school are, whenever possible, employed instead of a fixed series of models. The girls have sewing and cooking. Not

mere ability to cook and to sew, but the skillful and economical management of a household is the aim of instruction. A week's problem for a group of girls may consist in purchasing food for a small specified sum, planning the bill of fare, and doing the actual cooking and service required for a family of a certain number. Advanced work of a practical nature for boys is provided for in day and evening commercial, technical and trade schools; and for girls, equal advantages are secured in special schools. The Superior Elementary Schools for Girls and the Professional Female Schools continue the practical work of the lower elementary courses and prepare girls for bookkeeping or correspondence; for industries such as the making of artificial flowers, gloves, or hats; for dressmaking or laundry work; or for domestic occupations. The Commercial School for Girls, which admits pupils at about fourteen years of age, is planned with a view particularly toward preparing clerks and accountants, and includes, in its course of three years, two modern languages. The schools themselves, as well as the assertions of the educational authorities, are an evidence of a very definite policy in the direction of the education of self-supporting women.

Such public elementary schools as those just described are a recent development in Rome; they did not exist before 1870, the date of the incorporation of the city into the kingdom of Italy. "So long as Rome remained under papal control elementary education was absolutely in the hands of the priests, and lacking the stimulus of competition, and of state supervision, was entirely inadequate, small in quantity, and poor in quality."[1] Upon the downfall of the papal temporal power the municipal authorities promptly inaugurated a system of free public schools in accordance with the government policy embodied in the Casati law of 1859, which demanded compulsory education and the certification of teachers.

The success of these efforts is partially admitted by one so little in sympathy with their object as Cardinal Satolli, who says: "The municipal authorities of Rome, in their anxiety

[1] Hinsdale, *Report of the U. S. Bureau of Education*, 1893–94. p. 370.

to impress the people and prejudice them in favor of the state schools as against the Catholic schools, went to great expense in erecting magnificent buildings, containing large and well ventilated rooms, gymnasiums, playgrounds, and every other adjunct of usefulness and comfort that hygiene and pedagogy could devise."[2]

How the church authorities have been stimulated in the establishment of elementary and normal schools is described in the article just referred to. There are now in operation two complete systems, including elementary, secondary higher, technical, and normal schools; the one system entirely secular and supported by the municipality and the government, the other, the Catholic school system, supported and controlled by the papal authorities, subject, however, to the state programs and certification of teachers.

A limited observation of the municipal public elementary schools leads to the conclusion that not only will these schools bear comparison with the systems of other large cities, but that much of suggestion may be found in the planning of school buildings, in the use of buildings, in the attention to sanitary condition, in the care for weak and destitute children, in the development of a curriculum to meet practical needs, and particularly in the cultivation of a spirit of civic pride and national patriotism. Nowhere more than in Italy and in Rome is there a greater appreciation of the fact that the future of the city and of the nation is largely dependent upon the character of the schools, and nowhere are greater efforts being made against illiteracy and prejudice toward the realization of national ideals.

JOHN F. REIGART

NEW YORK UNIVERSITY

[2] *North American Review*, December, 1894.

V

AN HOUR'S WORK DONE BY SCHOOL CHILDREN

After having studied the curve of the mental fatigue[1] caused in public-school children during their daily teaching, I sought for the results of mental work in an hour's lesson at the beginning and at the end of the daily teaching, and at the beginning and end of the scholastic year. I used for my researches male and female children; the former were of the average age of eleven years and seven months, the latter of eleven years and nine months.

The boys worked for one hour, from 9.45 to 10.45 on the 17th of January and on the 7th of June, and from 1.45 to 2.45 P. M. on the 21st of January and the 11th of June. The girls worked from 9.45 to 10.45, on the 19th of January and on the 9th of June, and from 2 till 3 P. M. on the 16th of January and on the 6th of June.

What was the kind of work most adapted for the researches that I desired to make?

I took into consideration first of all the trial by dictation, which I had used for the study of mental fatigue and Ebbinghaus' combination exercises, which had served me to establish the difference between the mental capacity of boys and girls[2] of about eleven and twelve.

I at once discarded the combination exercises as not being adapted to the case in question. In my opinion it was necessary to use an easier work, to the execution of which the scholar, on account of the daily practice, was sufficiently accustomed.

[1] "La stanchezza mentale nei fanciulli dalle pubbliche scuole." Bologna, Regia tipografia, 1901.

"The mental fatigue in school-children." Short account published in *The Lancet*, No. 10, 1st vol., 1901.

[2] Intorno alla capacita mentale di ragazzi e ragazze che frequentano la 5a classe elementare. Rivista sperimentale di Freniatria v. xxvii. Fas. II. 1901.

The dictation, then, appeared at first sight the best means of studying the curve of mental work produced by children during an hour's lesson.

It serves very well (as I have said in my work on the mental fatigue in school children) to prove the mental fatigue during the different moments of daily school work. On account of its easiness it is done without bringing into play any superior intellectual faculty, and is written more or less correctly according to the attention that the scholars can pay in the moment of its execution.

As the attention decreases in proportion as the mental fatigue increases, we can judge of the mental fatigue of the children at a given moment from the greater or less number of mistakes that we find in the dictation done in the same moment.

But for the research that I had the intention to undertake, I did not believe that the dictation was adapted, because to obtain the curve of the work during one hour's lesson it is necessary for the scholar to apply himself more attentively than he does when writing from dictation. Besides, the latter could not serve in my case, for the reason that if we will have a dictation well done we must wait till the phrase, or the proposition, which the teacher has dictated has been written by all the scholars before beginning to dictate the following one.

Therefore in one hour, during which the scholar can write from 80 to 90 propositions of common length, we shall have a loss of work which is represented by the sum of the little different losses of time during which the quickest scholars did not work whilst waiting till the others had finished writing the dictated phrase. And as we cannot determine this loss of time (which it is possible to do by other methods) we are not able in consequence to establish the loss of work made by the boys during the whole hour, and therefore the exact quantity of work done during an hour's lesson.

For these reasons I put aside the dictation, and I had recourse to a trial by arithmetic, because the scholar is accustomed to do this work, which is not so easy as the dicta-

tion; therefore he must use his mind more than is necessary for the execution of a simple dictation. Amongst the four operations of arithmetic I used division, contrary to what the greater number of those who have studied this argument have done. I gave to each scholar four sheets of paper (respectively numbered 1, 2, 3, 4), on each of which were printed ten division sums, distributed in this manner:

1 3987654÷369.	2 723456÷896.
3 4866537÷835.	4 957986÷987.
5 4030201÷569.	6 240300÷198.
7 1982436÷798.	8 987654÷782.
9 2834569÷945.	10 456789÷377.

Every sheet represented the work that the boy must do in a quarter of an hour. It is needless to say that the sheets I used in the morning experiments were different from those which I used in the afternoon.

In order to prevent the boys from helping each other I arranged that whilst a scholar for the first quarter of an hour was working on sheet No. 1 the boy next to him began on sheet No. 3; the former passed from sheet No. 1 to sheet No. 2, and so on to 3 and 4; the latter in the second quarter of an hour did the operations on sheet No. 4, and then passed on to Nos. 1 and 2.

As I have already said, every sheet of paper on which were printed ten divisions represented the work of a quarter of an hour, and when this time was passed the scholar put aside the sheet on which he was working and began at once on the next one. If a boy finished his work before the expiration of that time he at once informed me and I wrote at the bottom of the sheet how many minutes he had employed in doing it.

In this manner I was able to calculate the time during which the scholar did not work and therefore, in proportion to the work done, and the mistakes made during the time in which he had finished his calculation, the work and mistakes that would have been made if he had worked during the whole time of the experiment. For the correction and calculation of these works I used a very simple method. I calculated the

number of the operations which each division contained and the mistakes that the boys had made. The operation well done which came after one mistake was not considered as an error, tho the final result of the division was different from that which it would have been if all the operations had been well executed. I did not take into consideration the auto-corrections, as I had done when I calculated the results of dictation in my work about mental fatigue, because I saw that they could not modify the curve that I obtained.

After these few explanations I give the results of the boys' work. The tables I. and II. that I put here, represent the work done by the boys on the 17th of January from 9.45 till 10.45 A. M.

From these tables we see that the scholars during the second quarter of an hour did 16,128 operations more than those they did during the first. But after this second period

JANUARY 17, 1901

BOYS, No. 42 FROM 9¾ TO 10¾ A. M. TABLE I

Time of Work	Number of Operations	Number of Mistakes	%	Average of Mistakes for each Scholar
9¾–10	140,616	99	0.070	2.35
10–10¼	156,744	152	0.096	3.61
10¼–10½	150,696	192	0.127	4.57
10½–10¾	148,680	209	0.140	4.97
9¾–10¾	596,736	652	0.109	15.52

TABLE II

Time of Work	No Mistakes	%	1	%	2	%	Highest Number of Mistakes
9¾–10	9	21.4	5	11.9	12	28.5	9
10–10¼	5	11.9	7	16.6	9	21.4	16
10¼–10½	5	11.9	5	11.9	8	19	26
10½–10¾	2	4.7	6	14.0	6	14	21

of time the work begins to decrease, tho it still remains greater than that done by the scholars during the first quarter of an hour. In the second quarter of an hour the scholars did 6048 operations more than in the third, and 8064 more than in the fourth. The number of the mistakes, and consequently their percentage, increases gradually from the first quarter of an hour, in which it is 0.070, to the last, in which the percentage is 0.140. With the percentage of mistakes their average for each scholar naturally increases.

In the table II., which collects in groups the scholars who made the same number of mistakes and shows the highest number found in each quarter of an hour, we see that the percentage of scholars who did not make mistakes is 21.4 in the first quarter of an hour; it decreases to 11.9 in the second and third, and falls to 4.7 in fourth, and whilst in the first quarter of an hour the highest number of mistakes was 9, in the second, third, and fourth we reckoned respectively 16, 26, and 21.

After having seen the results of the work done by the boys during one hour in the morning, we will examine the tables

III. and IV., which show the results obtained from the work done by the same boys during one hour in the afternoon, four days after the experiment made in the morning.

JANUARY 21, 1901

Boys, No. 38 FROM 1½ TO 2½ P. M. TABLE III

Time of Work	Number of Operations	Number of Mistakes	%	Average of Mistakes for each Scholar
1½–1¾	145,008	217	0.149	5.71
1¾–2	138,624	230	0.165	6.05
2–2¼	136,800	258	0.188	6.78
2¼–2½	124,032	285	0.228	7.50
1½–2½	544,464	990	0.181	26.05

From the third table we see that the number of operations decreases gradually from the first to the fourth quarter of an hour, whilst the percentage of mistakes and their average for each boy increases. The table IV. shows that the number of scholars who did not make mistakes is 3 in the first, second, and fourth quarters of an hour and 4 in the third. The highest number of mistakes made by the scholars was 18 in the first quarter of an hour, 33 in the second, 26 in the third, and 36 in the last.

It is very interesting to compare the results of the work done by the boys in the morning (Tables I. and II., with those which we obtained in the afternoon (Tables III. and IV.). From this comparison we see at first sight that in the after-

TABLE IV

Time of Work	No Mistakes	%	1	%	2	%	Highest Number of Mistakes
1½–1¾	3	7.8	4	10.5	4	10.5	18
1¾–2	3	7.8	3	7.8	6	15.7	33
2–2¼	4	10.5	5	13.1	2	5.2	26
2¼–2½	3	7.8	3	7.8	5	13.1	3

noon the scholars did, during the whole hour of work, 52,272 operations less than those done in the morning, with a higher percentage of mistakes.

After a minute examination of these tables we see that in the first quarter of an hour's work in the afternoon the scholars did 4392 operations more than during the same time in the morning; but whilst in the morning the production of work increases in the second quarter of an hour and decreases in the third and fourth, remaining, however, superior to that of the first, in the afternoon the quantity of work done by the scholars in the second quarter of an hour is less than that of the first, and than that of the same period of time in the morning. This diminution increases in the third and fourth quarters of an hour, and the production of work is always inferior to that of the corresponding period of time in the morning. If we consider the percentage of mistakes we see that in the afternoon during the first quarter of an hour it is superior by 0.079 to that obtained in the work done during the same period of time in the morning, as are also superior those of the second, third, and fourth quarters of an hour in

comparison with the same period of time in the morning by 0.69, 0.061, and 0.088. Also the averages of mistakes for every scholar are in the afternoon work always superior, even when the quantity of work was less than that done in the same period of time in the morning.

The comparison between the tables II. and IV. shows that during the first quarter of an hour of work in the morning 21.4 per cent. of the scholars did not make mistakes, 11.9 per cent. only one mistake, and 28.5 per cent. only two mistakes, and the greatest number of mistakes made was 9, whilst in the afternoon, during the same first quarter of an hour, the percentage of scholars who did not make mistakes was only 7.8, and the highest number of faults was 18, and the per cent. of scholars who made one and two mistakes was 10.5, 10.5. And in all the other quarters of an hour we always see that in the afternoon, except the last, the percentage of scholars who did not make mistakes was less than that observed in the morning; the percentage of boys who made only one or two mistakes was almost always inferior and the number of mistakes higher.

From what we have seen it results that in the first months of the scholastic year the boys did during the whole hour in the afternoon a less quantity of work which was worse as regards quality than what they had done during the same length of time in the morning.

After having seen the results obtained at the beginning of the scholastic year in the morning and in the afternoon, I will relate those obtained from the work done by the scholars at the end of the same.

Both in the morning as well as in the afternoon the scholars did the same divisions which had served for the experiments in the month of January.

From the tables V. and VI., which collect the results obtained in the work done on the 7th of June from 10 to 11, we see that during the second quarter of an hour the scholars did a greater amount of work than during the first; this quantity decreases in the third, in which it is inferior to that of the first, and increases again in the fourth, in which it is a little

JUNE 7, 1901

BOYS, NO. 41 FROM 9¾ TO 10¾ A. M. TABLE V

Time of Work	Number of Operations	Number of Mistakes	%	Average of Mistakes for each Scholar
9¾–10	166,788	263	0.157	6.41
10–10¼	168,264	312	0.185	7.61
10¼–10½	165,312	353	0.213	8.61
10½–10¾	168,756	417	0.247	10.17
9¾–10¾	669,120	1345	0.201	32.80

TABLE VI

Time of Work	No Mistakes	%	1	%	2	%	Highest Number of Mistakes
9¾–10	1	2.4	4	9.7	7	17	26
10–10¼	—	—	5	12.1	4	9.7	27
10¼–10½	1	2 4	2	4.8	4	9.7	28
10½–10¾	1	2.4	5	12.1	1	2.4	41

superior to that of the second. But the percentage of mistakes is not in relation with these oscillations in the quantity of work, because the former increases gradually and continually from the first to the last quarter of an hour, as does the average of mistakes for every scholar.

If we consider the number of scholars who did not make mistakes, and the greatest number of mistakes during every quarter of an hour's work, we see in the table VI. that in the first, third, and fourth quarters of an hour only one scholar did not make mistakes, whilst in the second all the scholars made mistakes, and the greatest number of faults increases, from the first to the fourth quarter of an hour, from 26, 27, 28 to 41.

The tables VII. and VIII. give the results obtained in the work done from 1.30 to 2.30 P. M. on the 11th of June.

In the table VII. we see that the production of work

JUNE 11, 1901

Boys, No. 36 FROM 1½ TO 2½ P. M. TABLE VII

Time of Work	Number of Operations	Number of Mistakes	%	Average of Mistakes for each Scholar
1½–1¾	140,400	294	0.209	8.16
1¾–2	138,672	335	0.241	9.30
2–2¼	138,240	357	0.258	9.91
2¼–2½	140,832	440	0.312	12.12
1½–2½	558,144	1426	0.255	39.60

TABLE VIII

Time of Work	No Mistakes	%	1	%	2	%	Highest Number of Mistakes
1½–1¾	1	2.7	4	11.1	4	11.1	25
1¾–2	—	—	2	5.5	2	5.5	33
2–2¼	1	2.7	—	—	3	8.3	30
2¼–2½	1	2.7	—	—	3	8.3	57

decreases from the first to the second, and from the second to the third quarter of an hour, and increases in the fourth, in which the scholar did 432 operations more than in the first. With that production of work we have a percentage of mistakes and an average for each scholar which increase constantly and gradually from the first to the last quarter of an hour.

The table VIII. shows that in the first, third, and fourth quarters of an hour only one scholar did not make mistakes, whilst in the second all made errors, and that the greatest number is 25 in the first, 33 in the second, 30 in the third, and 57 in the fourth.

If we compare the table V. with table VIII. and table VI. with table VIII. we see that in every quarter of an hour in the afternoon the scholars produced a less amount of work, which was worse in quality than that done by the same boys during the morning experiment. The number of scholars who did not make mistakes was identical in the morning and in the afternoon, and in this latter the greatest number of mistakes for each quarter of an hour, except the first, was

higher. Also the percentages of boys who made only one or two mistakes were almost always higher in the morning than in the afternoon. But it is more interesting to compare the work obtained at the beginning and at the end of the scholastic year.

First of all we will put in evidence the differences between the table I. and II., which show the results of the work done in the morning of the 17th of January, and the tables V. and VI., which collect the results of the work done on the morning of the 7th of June.

We see from this comparison that on the morning of the 7th of June the scholars produced a greater quantity of work than that done on the morning of the 17th of January. This work was, however, inferior in quality to that of the month of January. In reality, on the morning of the 7th of June the scholars did 62,384 operations more than those done in the same period of time in the month of January, because during each quarter of an hour they worked more than they had done in January. But in this work a higher percentage of mistakes and a greater average for each scholar was always found. Besides in each quarter of an hour of the work done in the month of January the number of scholars who did not make mistakes, or who made only one or two, was greater than during the same period of time in the month of June.

In this month the highest number of mistakes for each quarter of an hour was in comparison to the month of January always greater. And if we compare the tables III. and IV., which collect the results of the work done by the boys from 1.30 to 2.30 P. M. on the 21st of January, with the tables VII. and VIII., which show the results of the work produced during an hour in the afternoon of the 11th of June, we see that the same results take place.

The production of work during the whole hour was higher in the month of June than in the month of January, tho that did not happen constantly in each quarter of an hour. We always see, however, a greater percentage of mistakes and a higher average for each scholar even in the first quarter of an hour, in which we noted a less production of work.

The scholars who did not make mistakes were in each quarter of an hour more numerous in the month of January, as was almost always greater the percentage of boys who made only one or two mistakes. Besides, the highest number of mistakes which resulted during each quarter of an hour in this month was equal in the second, inferior in the first, third, and fourth, to that we observed in the month of June.

And now, after having examined the results obtained from the work done by the boys, we will take into consideration that done by the girls.

I used for these experiments the same division which I used for the boys.

The tables IX. and X. show the work done by the girls from 9.30 to 10.30 A. M. on the 19th of January, 1901. From their tables we see that the production of the work increases in the second quarter of an hour, and decreases in the third and

JANUARY 19, 1901

GIRLS, No. 44 FROM 9½ TO 10½ A. M. TABLE IX

Time of Work	Number of Operations	Number of Mistakes	%	Average of Mistakes for each Girl
9½–9¾	68,640	100	0.145	2.27
9¾–10	130,944	240	0.183	5.45
10–10¼	121,440	234	0.192	5.31
10¼–10½	129,360	266	0.205	6.04
9½–10½	450,384	840	0.185	19.09

TABLE X

Time of Work	No Mistakes	%	1	%	2	%	Highest Number of Mistakes
9½–9¾	4	9.0	5	11.3	5	11.3	9
9¾–10	3	6.8	6	13.6	5	11.3	21
10–10¼	4	9.0	5	11.3	9	20.4	27
10¼–10½	7	15.9	2	4.5	5	11.3	22

fourth. But I must note that the girls during the first quarter of an hour produced a quantity of work very inferior to that done in all the other moments of the experiments. Therefore very probably this quantity of work does not represent the real quantity that they could have produced in that given moment. This fact has perhaps its explanation in the unusual manner in which the work was put before them. In the first moments they did not succeed in applying themselves diligently, as is clearly shown by the quantity of work produced. This inconvenience could have been rectified by giving the girls a proof exercise a few days before.

The percentage of mistakes found in each quarter of an hour increases gradually from the first to the last; in spite of this their average in the third quarter of an hour is a little less than in the second, according to the less quantity of work done by the scholars in this period of time.

The number of girls who did not make mistakes does not show anything interesting. The highest number of mistakes found was 9 in the first quarter, 21 in the second, 27 in the third, and 22 in the fourth.

JANUARY 16, 1901

GIRLS, No. 43 FROM 2 TO 3 P. M. TABLE XI

Time of Work	Number of Operations	Number of Mistakes	%	Average of Mistakes for each Girl
2–2¼	113,004	176	0.155	4.00
2¼–2½	96,492	197	0.204	4.58
2½–2¾	94,428	231	0.244	5.37
2¾–3	81,528	220	0.269	5.11
2–3	385,452	824	0.213	19.16

TABLE XII

Time of Work	No Mistakes	%	1	%	2	%	Highest Number of Mistakes
2–2¼	5	11.6	8	18.6	2	4.6	14
2¼–2½	4	9.3	7	16.2	3	6.9	22
2½–2¾	2	4.6	4	9.3	8	18.6	27
2¾–3	7	16.2	6	13.9	2	4.6	23

From the tables XI. and XII., which collect the results of the work done by the girls from 2 to 3 P. M. on the 16th of January, 1901, we see that from the first to the fourth quarter of an hour the quantity of work decreases, whilst the percentage of mistakes and their average for each scholar increase. The number of the scholars who did not make mistakes, or who made only one or two, resulted without any rule. The highest number of mistakes was 14 in the first quarter of an hour, 22 in the second, 27 in the third, and 23 in the fourth.

And if we compare the results obtained in the morning of the 19th of January with those obtained in the afternoon of the 16th of January we see that, except in the first quarter of an hour, in which the comparison cannot be made, for the reason already given about the work of the first quarter of an hour in the morning, the scholars did a less quantity of work in the afternoon. This less production of work was accompanied with a higher percentage of mistakes. The average of faults for each scholar was in the second and fourth quarters of an hour in the afternoon inferior to that of the same period of time in the morning, tho the quality of work was worse, as was shown by the superior percentage of mistakes. The explanation of this apparent contradiction is easy when we take into consideration that the number of mistakes was less in reality, but higher in proportion to the less quantity of work done. We do not see any difference in the number of scholars who did not make mistakes, but the highest number of faults was, in the morning 9 in the first quarter of an hour, 21 in the second, 27 in the third, and 22 in the fourth, whilst in the afternoon it was 14 in the first, 22 in the second, 27 in the third, and 23 in the fourth.

Therefore we can conclude that the work done by the girls during an hour in the afternoon of the first months of the scholastic year was less and worse than that produced by the same girls during one hour in the morning.

The tables XIII. and XIV., collect the results of the work done by the girls form 9.45 to 10.45 A. M. on the 9th of June.

JUNE 9, 1901

GIRLS, NO. 40 FROM 9¾ TO 10¾ A. M. TABLE XIII

Time of Work	Number of Operations	Number of Mistakes	%	Average of Mistakes for each Girl
9¾–10	112,800	199	0.176	4.97
10–10¼	111,360	267	0.239	6.67
10¼–10½	106,080	285	0.268	7.12
10½–10¾	108,480	301	0.275	7.52
9¾–10¾	438,720	1,052	0.241	26.28

TABLE XIV

Time of Work	No Mistakes	%	1	%	2	%	Highest Number of Mistakes
9¾–10	5	12.5	5	12.5	5	12.5	19
10–10¼	2	0.5	1	2.5	4	10	21
10¼–10½	3	7.5	4	10	2	0.5	23
10½–10¾	3	7.5	1	2.5	4	10	22

From these we see that from the first to the third quarter of an hour the production of work decreases, and increases again in the fourth, whilst the percentage of mistakes and their average for each scholar increases continually. The number of girls who did not make mistakes, or who made only one or two, shows little difference in each quarter of an hour, and the highest number of mistakes is 19 in the first, 21 in the second, 23 in the third, and 22 in the fourth.

In the tables XV. and XVI., which show us the results obtained in the work done by the girls from 2 to 3 P. M. on the 6th of June, we see that the quantity of work increases a little from the first to the second quarter of an hour and decreases in the third and fourth. During this last the girls did 11,040 operations less than in the first. The production of work of each quarter of an hour is accompanied by a percentage of mistakes which increases gradually from the first

JUNE 6, 1901

GIRLS, NO. 40 FROM 2 TO 3 P. M. TABLE XV

Time of Work	Number of Operations	Number of Mistakes	%	Average of Mistakes for each Girl
2–2¼	104,640	213	0.203	5.32
2¼–2½	108,480	235	0.216	5.87
2½–2¾	100,800	287	0.284	7.17
2¾–3	93,600	283	0.302	7.07
2–3	407,520	1,018	0.249	25.45

TABLE XVI

Time of Work	No Mistakes	%	1	%	2	%	Highest Number of Mistakes
2–2¼	5	12.5	6	15	7	17.5	27
2¼–2½	3	7.5	3	7.5	5	12.5	24
2½–2¾	5	12.5	3	7.5	—	—	33
2¾–3	4	10	4	10	7	17.5	45

to the fourth. The average for each scholar increases from the first to the third quarter of an hour and decreases a little in the fourth, according to the less quantity of work done.

The differences which one finds amongst the numbers of the girls who did not make mistakes, or who made only one or two, are without any rule. The highest number of mistakes was 27 in the first quarter of an hour, 24 in the second, 33 in the third, and 45 in the fourth.

If we compare the results obtained from the work done in the morning of the 9th of June (Tab. XIII. and XIV.) with those obtained from the work done during one hour in the afternoon of the 6th of June (Tables XV. and XVI.) we see that in this last, during each quarter of an hour, a less production of work was constant, with a percentage of mistakes which, except in the second, was greater than that obtained during the same time in the morning. The average of mistakes was sometimes higher and sometimes lower, but the total sum was less in the afternoon than in the morning. The number of scholars who did not make mistakes was equal in the first quarter of an hour, a little greater in the second,

third and fourth during the afternoon, and the highest number of mistakes found in each quarter of an hour was superior in the afternoon to the morning.

Therefore the results of the work in the afternoon in the last month of the scholastic year were a little worse than those of the morning. But, as I have said, when I examined the results obtained from the work of the boys, the most interesting thing is to compare the work done at the beginning and at the end of the scholastic year.

From the examination of the tables IX. and XI., which collect the results of the work done by the girls during one hour in the morning of the month of January with the tables XIII. and XIV., which show the quantity and quality of work produced by the same girls during the same hour in the month of June, we see that during this last hour, except in the first quarter, the girls always produced the less quantity of work. This production of the afternoon was always accompanied by a higher percentage of mistakes and a higher average from each scholar.

If we consider the percentage of the girls who did not make any mistakes or only one or two, we see that it is superior in the second, third, and fourth quarters of an hour at the beginning of the scholastic year to that obtained in the month of June, whilst in this month the percentages of the first quarter of an hour are a little higher than the corresponding ones of the month of January. The highest number of mistakes found in each quarter of an hour of work in the month of January is inferior to that obtained during the same period of time in the month of June in the first, equal in the second and fourth, and superior in the third. Therefore, during an hour's work in the morning at the end of the sholastic year the girls gave results worse than those they gave in the first month of teaching. And from the comparison between the work done during one hour in the afternoon in the first months of teaching (Tab. XI. and XII.) and at the end of the scholastic year (Tab. XV. and XVI.) we see that in the month of June the girls, if we except the first quarter of an hour, produced a greater quan-

tity of work, which was, during the whole hour, superior to that done in the same hour in the month of January. But the percentage of mistakes and their average for each scholar were higher in the month of June than in January.

From the comparison of the number of girls who did not make any mistakes, or only one or two, we cannot see anything interesting, but the highest number of mistakes found in each quarter of an hour was superior in the month of June to that found in the month of January. In this last month it was 14 in the first quarter of an hour, 22 in the second, 27 in the third, and 23 in the fourth, whilst it was 27 in the first, 26 in the second, 33 in the third, and 45 in the fourth during the work done in the afternoon of the month of June.

Therefore, also the results of the work done by the girls during one hour in the afternoon at the end of the scholastic year were worse than those obtained from the work done by the same girls during the same period of time in the first months of teaching.

And if we collect shortly the results obtained in all the experiments done, we see:

1st. That for the quantity of work done during each quarter of an hour we cannot have any interesting teaching from our experiments, if we except the results of the work done both by the boys and girls in the afternoon of the month of January. In both these experiments the production of work decreases continually from the first to the last quarter of an hour.

2d. That in all my experiments the percentage of mistakes, their average for each scholar, increased from the first to the last quarter of an hour. Also the highest number of mistakes augmented, but not so constantly, whilst the number of scholars who did not make mistakes or who made only one or two is without any rule.

3d. That in the experiments of the month of January, except in the first quarter of an hour, both the boys and the girls in the afternoon did a less quantity of work and worse in quality than that done in the morning; and altho the production of the first quarter of an hour was greater, the total

quantity of work during the whole hour was less in the afternoon than in the morning.

4th. That in the experiments made in the month of June we had constantly during each quarter of an hour in the afternoon a production of work that was less and worse than during each quarter of an hour in the morning.

5th. That the boys during each quarter of an hour in the morning and in the afternoon of the month of June did a greater quantity of operations than during the same time in the month of January, except in the first quarter of an hour in the afternoon of the month of June.

The work of each quarter of an hour in the last month, in the morning as well as in the afternoon, presented a greater percentage of mistakes, a higher average for each scholar, a less percentage of scholars who did not make mistakes, a higher number of errors and almost constantly a less percentage of boys who made only one or two mistakes.

The girls in the morning during the second, third, and fourth quarters of an hour in the month of June did a less quantity of work than that done in the corresponding space of time in the month of January; only in the first quarter of an hour it was greater in the month of June than in the month of January; but as we have already said, this result cannot be considered just; and in the month of June the percentage of mistakes and their average was constantly greater in comparison with those obtained from the work done in each quarter of an hour in the month of January. There was very little difference in the percentage of the girls who did not make mistakes and in the highest number of errors found in each quarter of an hour of work.

And during each quarter of an hour of work in the afternoon in the month of June, except in the first, the girls produced a greater quantity of work, and in spite of the less production during the first, the total quantity of work was greater in this month than in January. In the month of June the percentage of mistakes and their average for each scholar was always greater in comparison to those found in each quarter of an hour in the afternoon of the month of January.

We deduct nothing interesting from the comparison of the scholars who did not make mistakes and of those who made only one or two; but the highest number of mistakes during each quarter of an hour was greater in the month of June than in January. From my experiments I can conclude:

1. The quantity of work produced during each quarter of an hour presents no rule.

2. The quality of this work gets worse from the first to the last quarter of an hour.

3. The quantity of work done by the scholars during one hour in the afternoon is less and worse than that done in the morning.

4. The work done in one hour in the morning and in the afternoon in the last days of the scholastic year was almost always more but always worse than that done in the same period of time in the first months of teaching.

GIUSEPPE BELLEI

BOLOGNA, ITALY.

VI

THE PSYCHOLOGICAL AND THE LOGICAL IN TEACHING GEOMETRY[1]

As one interested from the general educational side rather than from the technical mathematical side in the improved teaching of geometry, I venture to present an uncertainty which lurks in my mind after reading Professor Halsted's able and suggestive article in the December number of the EDUCATIONAL REVIEW.

The field in which the uncertainty lies is the matter of the relation of the preliminary more intuitive and sensuous geometry to the later rational and rigorous geometry.

It is a question how far it is possible to separate the intuitive and applied geometry from the logical and scientific geometry, simply in terms of an earlier and a later, so that the former is done with once for all by the time the latter begins. The question in my mind is whether, until the student has reached the distinct plane of mathematical scholarship (and probably even then in the case of discovery as distinct from proof) there is not recurrent demand for a return to considerations and data which do not possess strict demonstrative quality. Are we to have a purely elementary geometry, which is wholly intuitive, finish it up at once for all, and then pass at a bound to rational geometry? Or is the real problem of teaching geometry one of *continuous* modulation and gradation from one to the other?

There is no question that Professor Halsted makes specific allowance for a preliminary geometry which does not strive to be rigidly demonstrative. As he says: "The field

[1] Since this article was written there has appeared in print (*Science*, March 13, 1903) the identical address of Professor E. H. Moore, entitled "On the Foundations of Mathematics," which dwells upon the evolutionary character of all mathematics as a reason for not making too fixed separation between various branches of mathematics or between pure and applied mathematics. I wish to record my indebtedness to Professor Moore for various suggestions.

in education is a proper one, and has come to stay" (vol. 24, p. 457). And at the close of his article he makes specific provision for modification "designed to facilitate class teaching and aquirement by immature minds" (p. 470). At the same time he insists very properly that such modifications and sensuous elements be a kind which will not arrest the movement toward a more adequate scientific method; or, as he puts it, "The preliminary must fit the rational geometry" (p. 457).

These two limits give us a perfectly determinate problem. On the one side we have this consideration: What factors not valid in a strictly demonstrative sense are needed in order to assist the mind, which is only in process of becoming logical in general and of becoming geometrically logical in particular, in securing its introduction into, and vital familiarity with, geometrical subject matter? On the other hand, we have this consideration: How shall the extra-logical factor be so introduced as not to leave mental habits and preconceptions which have later on to be bodily displaced or rooted up in order to secure a proper comprehension of the subject? This way of stating the question certainly involves no controversy as to principle and so affords a platform upon which mathematician and educationalist may alike stand. This leaves teaching, as Professor Halsted says (p. 470), "a matter for the genius, the insight, the tact" of the individual author or teacher. Such an one must constantly consider from two standpoints what adaptations to the existing state of experience and of mental power are advisable: That of immediate efficiency of teaching, and that of relationship to the rigorous logical formulation which is the ultimate mathematical goal. Not every concession is to be accepted, even if it does seem to facilitate easier and quicker immediate apprehension, for this may be at the expense of continuous increase of comprehension, and hence not really learning at all. It is quite conceivable even to a layman's mind that supposed necessary adaptations are sometimes made which are not necessary and which obstruct later study. On the other hand no departure from

absolutely logical methods is to be condemned simply because it is a departure. If such deviation be necessary to bring the subject within the range of the workings of the pupil's power, it is not in truth a deviation: The longest way around is indeed at times the shortest way home. Recognizing the two limits, the problem is not whether or no concession and adaptation to present visual and motor experience shall be made, but what particular adaptations are advisable and necessary.

So far it is clear sailing. There is no uncertainty. But I am disturbed by reading upon page 457 that it does not suffice "to start with inaccurate statements and, as we advance, to modify them so as to bring them into accord with wider vision and more stringent requirements. We must from the beginning bring up ourselves and our pupils on not only the truth, but the whole truth." This leaves quite the opposite impression, viz., that no adaptations or concessions whatever are to be made. This impression is strengthened from the fact that Professor Halsted at once proceeds to criticise a number of specific statements even in geometries of the professedly preliminary type, on the ground of failure to conform with the present status of advanced geometric science.

For example, in the discussion of the conception of the straight line as the most direct path of motion there is no hint of use of the test of adaptation or availability to conditions of growth reached. No other criterion of condemnation is used save scientific invalidity. Such invalidity certainly is conclusive as to the inadmissibility in the geometry of the mathematical science; that is, of the student who has reached a certain stage. But the question remains: Just when and where is this stage reached? Is it found in the mind of the first year high school pupil? Of the average college sophomore? Or where? If Professor Halsted's article were simply on geometry and upon the errors of the professed geometrician, such questions would be quite irrelevant, but he writes upon the Teaching of Geometry. A logical hiatus appears in the condemnation of a given definition of a straight line (and of course the same holds in principle of any other procedure he condemns), unless it is also shown that defini-

tion is quite unnecessary from the standpoint of effective growth *into* mathematics. This gap may indeed be quite coverable; it may be quite possible to show how a logically adequate conception of the straight line can be brought within range of apprehension from the very start. But until this possibility has been demonstrated it is logically insufficient to condemn any given method merely because it does not square up with the requirements of rigorous demonstrative science.

To put the matter more positively, I should say that to bring up the pupil from the beginning on the whole truth is simply impossible. There are psychological as well as physical impossibilities, and the statement indicates one of them. To try to put into practice such a method is to develop impossible text-books and train impossible teachers. *Towards* the whole truth with all our heart; *on* it, no, because it is a meaningless requirement. The need and demand for teaching arise from the fact that the whole truth is not there to build upon. For a mind to build upon the very thing which it is the goal of its endeavor to obtain is surely the Irish bull of pedagogy.

The question of the correct definition of the straight line is a matter of mathematics alone. A psychologist encroaches on such a field only at his deadly peril. But there is need for making clear the fact that the content of a given book or lesson for a given grade of pupils is not a matter of mathematics alone. It is a psychological matter as well, and upon such points educationalists who work upon a sound psychological basis do not transgress in expressing a judgment. The psychological questions involved may be reduced to two:

1. What organs of apprehension and interpretation does the student bring at a given time to the mastery of a particular topic? 2. What further mental modifications are induced and what reactions set up by the process of learning which the student employs?

1. What the student actually learns is not what is in the mind of the author or teacher who propounds the definition: What the student learns is what the proposition means to

him. This is certainly a truism. But it becomes a vital statement when we recall that what a given statement means to a pupil depends absolutely upon the interaction set up between the topic presented and the habits which the pupil brings with him to it. It is a question of interaction, and the content of the final mental state in a net resultant of both factors. Because the conception that two points determine a straight line satisfies the logical conditions of the mathematical mind, it does not inevitably follow that it satisfies the psychological condition of a sixteen-year-old boy or girl, even with the maximum of explanation which the intelligent and clear teacher may give. The formal and verbal definition is the same to the expert and to the pupil; the mental definition (the measure of the actual learning) may be very different. It is even possible that the only meaning which the statement has to an intelligent beginner, working under the most favorable conditions, is suggested by Professor Halsted's statement that the assumption that two points determine a straight line "may be taken as authorizing the *graphic* designation of points and the *graphic operation to join* two designated points by a straight" (p. 468; italics mine). It may be the operation of drawing the line, and seeing it as it is drawn, which affords the actual mental content, or definition psychologically considered. In this case the student nominally employs the same definition that the scientist uses; but none the less he conceives the straight in terms of motion (symbolized by the drawing of the line) and of directness of course (symbolized by the track which marks the path of the moving point). If such be the case then the student is utilizing exactly the notion which Professor Halsted condemns, and nothing has been gained by a mere shift of terminology. If this notion is so abhorrent to mathematical logic that it must be avoided at all costs, then the problem is to secure such conditions of teaching as will prevent the student from employing terms of movement, and of course or track traversed, in realizing for himself the notion under consideration.

It is barely possible that even the advanced mathematician gets along without the addendum of reference to motion just

because he has so thoroly defined its conditions that the reference no longer affects or modifies any particular operation or result. Accordingly it is more economical to exclude it deliberately in a uniform way or by principle; that is, by methods which finally define the possibility of motion itself in terms of other definitions and axioms. Putting the point in a less paradoxical way, it is conceivable that the advanced mathematician gets on logically without any reference to motion, just because his abstraction from the original concrete conditions of reality has been so perfected that all the terms he now consciously uses are those which are exclusively determined and constructed by means of his own previous abstractions. This certainly represents the logical ideal, complete control, no data, elements, or conditions operating excepting those which have been intentionally introduced and formulated. For this very reason it would be equally legitimate, I suppose, to begin with definitions and axioms of motion and arrive at conclusions in a reverse way. All that remains is for the scientist to play his own game according to the rules and conditions which he has himself determined. All this, of course, implies an original abstraction from, and *hence conscious reference* to, the complex conditions of reality, and demands a series of intervening similar abstractions of constantly increasing remoteness. The learner, of course, is at the other end of the series. *His* problem is not that of conforming a new construction to conditions created by previous abstractions, but that of overcoming the difficulty of making any abstraction of the sort desired. In all further steps as a learner he has to look both ways. On one hand, in order to abstract successfully from reality he has consciously to present that concrete reality to himself; he has, if you please, to be sensuous and intuitive and applied (that is to say, psychological) rather than abstract, demonstrative, and rigorous (that is, logical). But he also has to direct his further procedure in conformity with abstractions previously made and their resulting conditions. He has to abide by them and to harmonize his further endeavor with them. In so far he is logical. Anyone who gets hold of learning as a continuous process or

movement of this kind will, I am sure, have with respect to principle no difficulty in reconciling the psychological or pedagogical statement with the scientific and logical; his difficulties may be numerous enough, but they will be in the region of detail, of practice, not of theory.

To return to our example: It is conceivable that the conscious recognition of a path of motion affords just the sort of combination of reference to concrete experience and to logical abstract as fits it to be a working tool for effecting transition from the unanalyzed complexity of present experience toward the defined control of greater abstractness. Relative to the pupil's *previous* experience, the conception of a path of motion is an abstraction; one, indeed, which offers considerable difficulty. The student has had plenty of experience of moving bodies, but may never have had occasion to discriminate between the moving body and the course it takes, the path it traverses and describes. Quite likely, too, he has had no occasion to conceive of motion reduced to lower terms, and defined as the track of a point rather than as that of a solid.

The point under consideration comes out clearly in the quotation from Laisant (p. 446) to the effect that the definition of a straight line as the shortest distance between points is *incomprehensible* to the beginner. The context clearly shows that this incomprehensibility is logical, not psychological. The idea of shortest distance certainly involves another idea, the length of the curve; and this in turn is capable of definition only as the limit of the sum of rectilinear length. These two considerations are certainly conclusive from the logical standpoint as to the impossibility of final comprehension. Logic, one may say, *is* comprehension; and what is il-logical is *ipso facto* in-comprehensible. But there still remains the psychological question: At what stage of development of an individual mind can logical comprehension of this type be secured? The problem of the beginner is not that of comprehension so much as that of apprehension—that is, of vital introduction to and assimilation of a new fact or idea. Taken on this score, it is possible that the

notion of a straight line as the track, or course, or path of a point in most direct motion is not only comprehensible, but offers the maximum of comprehensibility. Speaking from the standpoint of an individual mind, such a notion may involve more actual abstraction and generalization than would for him the definition that satisfies the accomplished student. In previous experience the conception of a line has been bound up with a large number of other considerations which are irrelevant from the standpoint of geometry, and which accordingly must be deliberately excluded. If the conception of a straight line which is so unsatisfactory to the one who has surveyed the field, who has compared straight line and curve, is the most effective tool to effect this abstraction, then, in teaching it cannot be dismissed simply by reference to the logic of the mind that adequately realizes all the conditions which determine the outcome.

2. I mentioned a second test on the psychological side: that of the mental disposition, of habit-tendency, created in and thro the act of learning. We have to consider the whole mental attitude set up by reaction to a given mode of presentation. Some minds are probably well adapted to consider strict mathematical relations, on their own ground, at quite an early age. It would be strange if there were not some to whom the strict scientific treatment appeals in some or in many topics at the age of sixteen, or even of twelve. The mathematical diathesis is doubtless as real as any other. It is certainly a mistake to keep such pupils on a less strong diet than they are able to digest and grow upon. But what of the others? What of those whose interest in this mode of instruction is restricted? Those to whom the game of absolute logic does not appeal, those who are not called to ascend to the higher levels of science, or ever perhaps to reach much control of geometry as a pure tool? Mathematicians as mathematicians are not called on to reckon with this class; but those who are concerned with teaching must take them into account. In the case of such minds a premature introduction to logical niceties and scientific accuracies simply increases intellectual and emotional repugnancy, and tends

to induce habits of resort to mere memorizing, to tricks of recitation, to all kinds of evasion, mental and practical, or even to downright cheating; and finally to aversion to all further pursuit of subjects that even suggest the disagreeable experiences associated with mathematical learning. In other words, a method which is somewhat loose from the logical side (and this once more means simply the standpoint of the matured mind, surveying the whole field as a single inter-related whole,) may be strict from the standpoint of present possibilities and also of impetus to further growth. There may be students who can secure from resort to algebra, to arithmetic, to mechanics, to graphic device, and to scores of resources that are not vigorous, mental discipline, mental activity and a growth in mental power not otherwise to be secured. There may even be pupils for whom to stretch a string, to drop a plumb line, has more *ultimate* logical worth than would be got by the original definition of a straight line as determined by two points, apart from reference to motor and visual experience.

If such things be true (and the emphasis is upon *such*) a further question arises: Whether the supposedly logical element of formal definitions, etc., may not be overdone in geometries of the prevailing type, so that (while improvement is to be expected in one direction by resort to stricter methods) reform may come from dropping some of the present show of scientific vigorousness. A psychological apprehension as distinct from a logical comprehension is valuable when it marks an advance over more imperfect intellectual attitudes and when it gives impetus to some further intellectual control. Why not, then, deal frankly with teaching on this basis? The definitions in the average text-book now used, whether or not they measure up to a strict standard, at least usually claim to present the matter in rational form. Might not better results be reached in many cases if notions were proffered not as making any such profession, but simply as statements of the point of view already reached and as leading on to a working method for future use? This standpoint would not, of course, exclude specific verbal formulation. On the contrary, a

proposition would naturally come in to summarize the result reached,—tho even here due opportunity should be provided for pupils to try their own hands at making the summary statements. But the formulæ should be given in such a way that the student would recognize that they are provisional resumés and working hypotheses, not definitions purporting to possess finished logical worth.

Even here, in frankness, I must express my doubt whether the definition of even the competent mathematician is absolutely logical in any other sense than answering to the status of mental growth, mastery of methods and problems reached by him, in the same sort of way that the relatively rough and ready notion of the beginner answers to the growth and needs of the latter. I would suggest that the distinction of psychological and logical is after all only one of historical periods in a process of growth, and is a distinction having meaning when periods taken in their sequence may be contrasted, but not when taken barely in themselves.

This, perhaps, is introducing a topic of possible controversy; if so, it is unfortunate. For in the former considerations I see the possibility of an *eirenicon* between the scientific mathematician and the educationalist, so far as relates to practical matters of teaching. The former, as I understand it, quarrels with many of the definitions and methods of current text-books and teachers because they are illogical, some of them almost to the point of self-contradiction. Very well. The educationalist also quarrels (and in the main at much the same points) because the definitions and methods are not well contrived and selected from the standpoint of psychological adaptation. There is some truth in the belief that a current text-book is neither one thing nor the other. Trusting to Professor Halsted's authority, it lacks much of true geometric character; trusting to the belief of many educators, its *profession* of scientific rigidity, its claim to use absolute logical methods, prevents a free use on the part of the pupil of his own experience and its flexible employ in apprehending the matter presented and in getting a tool for further effective control. Surely, when we

claim to have the scientific standpoint, that of rational statement and development, then we should have it in its purity and absoluteness. But in the degree which this is impossible, we should not allow pseudo-science or any inheritance from the past history of mathematics, or any imitation at several removes of present mathematical concepts, to come between the teacher and the freest possible use of all matters and methods that will facilitate learning, and that will stimulate the growth of power of mathematical abstraction and generalization.

It is the halfway state, the compromise in present methods, that makes much of our difficulty. To the educator's eye, these are largely unpedagogical; to the mathematician's they are, it would seem, more or less unscientific. Wherever possible let geometry become more rigorous; wherever this is not possible, let us drop a pretense of logical quality which only loads us down with an outward and cumbrous apparatus, and content ourselves with doing whatever under the circumstances can be best done from the standpoint of teaching. A state of things which is neither rigorously logical nor yet justifiable psychologically, should not be permitted, with high-school pupils any more than with elementary, to prevent personal acquaintance with experiences which call for the use of geometric statement, nor familiarity with concrete applications of geometric principles. When the pupil is not capable of grasping the axiom or definition in the form logically required, it would appear to be better not to hamper him with a formulation which seems to be scientific but is not really so. Permit all such matters to remain more or less fluid, taken for granted practically rather than stated as logical assumptions, and there may be both an increase of present interest and of adequacy of apprehension, and also less obstacle to further developments of a more rigorously demonstrative sort.

It does not seem possible to draw a fixed line between the primary- and the grammar-school pupil; between the grammar- and the high-school pupil. At each point the pupil needs whatever of formulation and definition he is capable of really

grasping, and whatever introduction into strict deductive reasoning he is capable of. But he also needs the habit of looking at definitions and propositions with reference to the real experiences which they express. He needs to see in them a sort of language in which the various symbols have meaning, not only in relation to each other, but also as expressing the experiences of life. More than any other one thing it would seem as if the high-school pupil, in particular, were at the point where his greatest need is neither merely intuitive nor strictly demonstrative geometry, but rather skill in moving back and forth from the concrete situations of experience to their abstracts in geometric statement. If the teacher be sufficiently imbued with the standpoint and methods of rational geometry, and yet remember that he is a teacher and not merely a mathematician, there is little ground for fear that progress in demonstration will not be as steady and rapid as circumstances really permit.

Not the least value, then, of Professor Halsted's article, to my mind, is that it condemns those books and teachers that profess logical rigidity and yet come short of it. Thus it should allow free scope to the principle of adaptation to conditions of need and growth. The point that I would urge as supplementary is the need of modulation in transition from the more intuitive to the more demonstrative phases of the subject. It is difficult to see how, short of having already become a mathematical specialist, some recourse to illustration and application in experience can be eliminated. Indeed, I am told that even in the very highest phases of mathematical inquiry there are still some matters in which even the trained mathematician finds it advisable to resort to intuitive constructions.

If this problem of modulation had been borne in mind more definitely, I do not think the "Perry Movement" would have come in for such apparently unreserved condemnation. It is the *teaching* of mathematics that the Perry Movement is particularly concerned with. To criticise that movement as to certain possible shortcomings from the standpoint of perfected mathematics is not entirely to the point. Im-

provement in the teaching of geometry is certainly dependent upon those who concern themselves with its more rational formulation and rigorous sequence. But it is also dependent upon those who look at it from the standpoint of common sense or ordinary experience; from its various practical applications in everyday life to technology and utilitarian ends; and upon those who ask for elements in the experience and intelligence of the pupil which may make his mathematics more vital to him. These two groups should co-operate with each other; not line up as hostile camps.

The serious problem of instruction in any branch is to acquire the habit of viewing in a twofold way the subject matter which is to be taught day by day. It needs to be viewed as a development *out* of the present habits and experiences of emotion, thought, and action; it needs to be viewed also as a development *into* the most orderly intellectual system possible. These two sides, which I venture to term the psychological and the logical, are limits of a continuous movement rather than opposite forces or even independent elements. First and last of all, moreover, we need to recognize that while this is a movement which mind in general passes thru, it is a movement which the minds of individual pupils are concerned with in very different degrees. Some minds are so framed to take an interest in method as method. Such pupils should have every opportunity to carry the interest with a purely logical statement and deduction to its *Ultima Thule*. But there are many other individuals (probably a considerable majority of mankind taken in gross) to whom considerations of method will always remain valuable chiefly because of their instrumental significance—because they are tools in the region of application, invention, construction, and for interpretation and further use of what has already been invented and constructed. It is a social wrong under the name of pure science to force such minds into paths having next to no meaning for them, and which consequently lead next to nowhere.

JOHN DEWEY

THE UNIVERSITY OF CHICAGO

VII

SOME EDUCATORS I HAVE KNOWN (II)

THE NATIONAL COUNCIL OF EDUCATION

In 1884 I was chosen a member of this body. As a member of this organization, I have come into close contact with many of the most prominent educators of this country, and consequently I have enjoyed excellent opportunities of hearing many distinguished men present their views on various educational topics. It was not far from this date that I began to take an active part in the superintendents' meetings, and here again I formed a large circle of acquaintances, especially among the younger and more ambitious superintendents in the smaller cities. There was also another class of educators with whom I have been on the most intimate terms, the normal-school men, perhaps owing to my pronounced opinions in favor of the great work those persons had done and were doing to supply the country with good teachers. They were studying how to teach and present the subject matter to the child and when it should be given to him—better and more rationally than any other class of workers. The college and university men formerly, with few exceptions, never mingled much with the common toilers, but rather held aloof, not intentionally, but from a long line of hereditary influences which had grown into the habits of apartness and growling. A few here and there, however, were always among us and with us. Their example " about-faced " the more conservative, and now they are, that is all the growing ones, as other people—not separatists.

To speak of all the men I have known in these departments of educational activity would be to write a biographical dictionary of American education for the last twenty-five years.

EMERSON E. WHITE

When I first met Dr. White he had written an arithmetic, and he was the first author I ever saw. It was at the session

of the National Educational Association held in St. Louis, 1870. Dr. White, Superintendent J. P. Wickersham, W. D. Henkle, John Hancock, and Professor Truman Safford were sitting at dinner in the Laclede Hotel, and I sat at a table near by listening to their conversation. They were discussing compulsory education. Dr. White and Superintendent Wickersham did not favor it, while some of the others were rather enthusiastic. I listened with deep interest, because they were all great men in the educational world. I would call the discussion now an exchange of views in a friendly conversation.

There was no one to introduce me to any of these gentlemen, but I felt that I had some little grounds upon which I could make myself known to Messrs. White and Henkle—so when these gentlemen went to the office, I introduced myself to Dr. White, saying that I had taught his arithmetic, and he in turn introduced me to Superintendents Wickersham and Henkle. The next day on a trip to Iron Mountain I had a conversation with Mr. Henkle, and when I told him that I had worked thru his *University algebra,* he said, "Well, you found it as tough as bull beef at a penny a pound." This was the only time that I ever talked with him, and the only time I ever saw him. His conversation impressed me as that of a jolly fellow who had picked up and dived into more hidden and obscure things than any other man I have ever known. His knowledge was very exact, and extended over a large area of disjointed facts which he took special delight in explaining. His mental accumulation was a wonderful collection of *Notes and Queries,* and perhaps not altogether unlike De Morgan's *Budget of paradoxes.*

Dr. White always moved on another plane. He always took a high and serious view of all questions connected with school affairs, keeping continually in mind what would be best for the educational development of the boys and girls of this country. He stood for both the practical and the culture side of education on a high moral and religious basis. His mind was analytical, practical, clear, and his convictions deep rooted in the higher elements of human nature. His aim was

to make teaching the highest, most skillful, and most important art by which men and women, consecrated to their work, can ennoble and dignify human nature. His mind was of the John Calvin type, as was manifested whenever a question was raised in connection with the organization of the National Educational Association or of the National Council. In my judgment, he and Superintendent Gove have kept more closely in touch with the spirit of those who founded both these organizations than any other men in this country. As James Madison is called the Father and Expounder of the Constitution of the United States, so I would call Dr. White the Expounder, if not the Father, of the Constitutions of these two educational organizations.

Some years ago I visited him at his delightful home in Columbus, and one thing that I noticed in his educational library was the large collection of bound school journals and magazines. He had about everything of any value that had ever been published in this country, and so placed that he could turn instantly to whatever he wanted.

Dr. White's mind was so constituted that when a new proposition was brought forward with seeming plausibility he immediately began to take it to pieces to find out what old elements were involved in it, and to separate the old from the new. Frequently an analysis after he made it left no new element to be considered. One great hindrance to real progress in education is that of experimenters, not knowing what has been done, who strike out on new lines which have been exploited and cast aside in different localities as utterly worthless. Probably nine-tenths of the new brought forward is not new, but a revamping of some old worn-out device. In the most courteous manner possible the doctor pricked such educational bubbles and then left them collapsed. Some think he was a little inclined to be distant, if not austere; nothing could be farther from the truth. He was kind, genial, sympathetic, and just as tender as a woman in his feelings. His words were always encouraging, and his faith in the triumph of truth boundless. He was the veritable Nestor whom we reverenced for his wisdom, justice, and knowledge.

GEORGE HOWLAND

George Howland had been a teacher thirty years before I spoke to him. He had been superintendent of the Chicago schools a year before I met him. I had two persons in my mind during that interview, Duane Doty and George Howland. Once I had called on Superintendent Doty, and, finding him to be a good fellow, I mentioned his "educational aphorisms and proverbs" that had recently appeared in the school journals. He laughed as heartily as one could under the rather embarrassing turn the conversation had taken. He was a bluff, rugged-looking man, but it was all on the outside, because I found him a very genial, ready conversationalist and quite ready and willing to talk on school questions. One had not to pull and pluck out an idea here and there and get monosyllables for sentences. I came away with the feeling that he was a good fellow and one of sound judgment, and that when an opportunity offered I would see him again. I liked him. Such were my thoughts when I mounted into George Howland's office the first time. When I entered he was engaged in conversation with one of the grade teachers who wanted assistance in the management of a troublesome boy. The case was disposed of, or halfway so, and she was advised to try another line of tactics, as the old man did in the spelling book when he found a "rude sauce-box in his apple tree." The teacher retired with a far-away look on her face, and I walked up, hat in hand, and introduced myself. He looked at me a moment, took hold of my hand, and said, "Greenwood, I am glad to see you; sit down. From your articles, I had thought you to be a great big, fighting fellow, but you are not." Right then and there our friendship began and never diminished. We soon drifted out into books new and old; his taste was literary, and in that atmosphere his mind dwelt. He stood for broad culture among the teachers of Chicago and elsewhere, and in our talks ever after the chief topic was books —the greatest that had been written. He appreciated the beautiful and the elegant in writing. His taste had been developed and trained in his younger days in the New England

atmosphere, and out of it he had imbibed the best. To see him at his best, however, it was necessary to sit with him and two or three others in a quiet nook somewhere, and listen to the interchange of opinions. No difference whether he was speaking of a book or his boyhood days in New England, his conversation was always charming.

Three of us were early risers, Superintendents Howland and Dougherty and Greenwood. During an educational association it was no uncommon thing for us to be up of a morning at the hotel before the office was scrubbed. Many a morning hour have we three sat around and talked over all sorts of subjects—chiefly of an educational character. This practice of early rising was drilled into each of us automatically when children. While some of our more sleepy companions twitted us with trying to oversee the hotel management, yet our chats were just as lively and perhaps a trifle freer than when the audience was larger.

What made George Howland dear to the teachers of Chicago was his sane judgment and his absolute fairness. He was no trickster. He was honest. There was no trace of treachery about his nature. He believed in solid study and sound training, and he knew no short cuts to learning. Never shall I forget when he had an attack of vertigo at the St. George Hotel in Brooklyn when Superintendent Gove and myself took care of him, and finally brought him to another hotel in New York. After working with him for some time he recovered enough to say, "Boys, it has been a pretty close call." Not long after that I read an account of his death.

EDWARD BROOKS

Among the normal-school men Superintendent Edward Brooks exerted a greater influence over my methods of teaching mathematics than any other man in this country. I never saw him teach a class, but I studied his writings and especially his remarks scattered thruout his text-books on how to teach the elementary branches of mathematics. His mind worked logically from data given, and in language that never over-shadowed the thought it conveyed. He appreciated most

clearly the difference, if I may so express it, between the cart and its cargo. In the model solutions of problems he went at what was to be done in the most direct and common-sense manner, and whatever he did carried with it the delicate touch of the literary artist. It was not till the Topeka meeting of the Educational Association in 1886 that I met him personally, and at first sight it seemed to me that I had always known him. I was pleased indeed to find him a refined gentleman of wide culture—interested more in literary and kindred subjects than in mathematics. As a city superintendent he represents the cultured scholar, and not the narrow specialist. For a quiet chat I do not know a more congenial companion and one who holds in the background a more sharply defined and well-proportioned educational perspective. The same calm judgment displayed in business affairs, enables him to estimate a teacher's work at its correct value. As John Richard Green points out in one of his letters to E. A. Freeman that a historian ought to be able to pick out the big facts from the little facts, so Dr. Brooks always knows the big facts of teaching from the little facts.

AARON GOVE

Aaron Gove is the best educational, financial city superintendent in this country. Persons who have not measured and tested him on all sides know little of him or his splendid resources in school supervision, judgment of school work, planning the construction of school buildings, or devising ways and means of solving financial difficulties arising out of school conditions. Some school superintendents have little or no business capacity whatever, and more school wreckages have been caused on this account than all other causes combined in connection with school supervision. School boards, while continuous as an organization, are temporary in their constitution and functions. If people think a board goes too far, it is displaced in a year or two by a more conservative body. If a superintendent has not business ability to point out to a board what is necessary, and what would be extravagant, in the appropriation and expenditure of money, then he

may have to change every time adverse sentiment sets up. Frequently school boards must be saved from themselves, and a cool, level-headed business superintendent is the only person who can do it. When a community comes to the conclusion that a school board is extravagant and the people believe that they are not getting value received for the money expended, dissatisfaction becomes widespread, and there is no way to head it off, except by the election or the appointment of a new governing body. Looking far ahead and keeping his schools up to the highest notch of educational efficiency, and knowing just about how much teachers and pupils can do and neither be injured, Aaron Gove is certainly one of the most expert men our country has yet produced. He has studied citizens, teachers, and pupils in the concrete, and he knows human nature, the genuine article as it is, better than all of us who have been laboratorying, pillorying, and labeling the specimens for the last fifteen or twenty years.

One of the curious coincidences of educational differences and agreements I will refer to here. Dr. G. Stanley Hall has been trying, as I take it, to change motherhood in this country to the short, stout, stocky breed of people from out of the lithe and willowy Yankees. The subject has been running topmost in his mind for a long time, just as astronomy did in Mazzini's scheme of making something out of man. Now, Superintendent Gove has been very outspoken for years, if not as pronounced as Dr. Hall, in regard to the kind of education our girls should receive. Just touch him up on this phase of education, and he thrusts aside his high tragic air and grows eloquent immediately. It is not at all improbable that he and Dr. Hall will yet produce a joint volume on Female Education. This is an aside, however, and should not be taken too seriously.

Of all the prominent educators that I have known, I place Aaron Gove as the most sensitive, the clearest visioned in estimating public opinion, the most critical, and one of the best judges of graded school work that we have. In financial and administrative ability he has no superior. At heart he is one of the kindest and truest men that ever lived.

ANDREW S. DRAPER

My acquaintance with Andrew S. Draper dates back to a meeting of the Right Worthy Lodge of the Good Templars, held in Boston in May, 1873. This was the first time I ever saw the Atlantic Ocean. It was during this visit that I wandered into Harvard College, described in a former article. Judge Draper was one of the delegates from New York and I was one from Missouri, and we met annually till the time Senators Conkling and Platt resigned their seats in the Senate of the United States and went before the Legislature of New York for indorsement. President Draper was an ardent Conkling man—a member of the General Assembly, and he wrote me that he could not be present at the approaching session of the Grand Lodge. We then drifted apart till he was elected State Superintendent of New York. When he was chosen, a howl big and loud went up from many of the throats of the school men of the Empire State, and I thought it the right thing to do to say a word in behalf of my friend, and I wrote an article for the *New York School journal* in which I stated that Andrew S. Draper was a well-balanced, level-headed lawyer, sensible and judicious, and that he would perform the duties of the office with intelligent discrimination, and that he would reflect credit not only on himself, but also on the cause of education in the State. The howl had by this time swelled into a roar about paying off political debts, ignoring the fraternity, and my well-meant letter went straight into the "waste-basket." As I watched the *Journal* each week, I thought of the "ship that never came." However, the New Yorkers accepted ungraciously the inevitable, and when the State Teachers' Association convened and Judge Draper read a paper before that body, then the "I told you So's" came trooping to the front. The result of this political appointment simply proved that even a layman who had been educated in the public schools of his native city, and had served as a member of the board of education, might achieve great success as an administrative officer and grapple successfully with the details of a great educational system. His public life is a mat-

ter of general knowledge, and I need not enter further into it in this sketch. Consequently, I shall speak more particularly of the strength of his character and the clear vision of his judgment and his ability to mingle with and influence people. First and foremost I shall mention his practical common sense. He sees clearly how things are, and what it is possible for them to become, and the means at command for bringing conditions to a satisfactory conclusion. He neither underestimates nor overestimates difficulties. He goes on the principle of mechanics. If an obstruction has to be moved, it requires the application of so much force to remove it. His mind dabbles not in philosophical or psychological speculations and hair-splitting distinctions, but proceeds to group and handle conditions as they exist, keeping in mind the common people and the teaching force and the children. In estimating his strength, I place it to the credit of his large organizing power, and his ability in presenting an argument in a simple, direct, forcible, and practical manner, augmented by deep underlying moral and legal principles based on common sense and individual experience. It is never a difficult task to ascertain how he stands on any public question. In no sense is he a trimmer. If a position is wrong in his judgment, he does not hesitate to say so. After he has once thought out his plans, he knows how to follow them logically to a conclusion, and yet he is never so biased by his own judgment that it would be impossible for him to change. When he reaches a critical point he knows whether it is better to hold on or to let go. In some respects he reminds me of Thomas Jefferson—a man of very decided convictions and always willing to trust to the common sense of the people if the matter was placed before them in its proper light. Mr. Lincoln had this deep insight and he always trusted the people, and he kept this fact in the foreground whether in the cabinet or on the rostrum.

When Judge Draper went to Cleveland there was a secret feeling among the educators of Ohio that he had sought the appointment, but that was not so in any sense whatever, as Mr. Frank A. Fitzpatrick and I both know beyond all shadow of a doubt, and neither would Judge Draper consider the proposi-

tion till he knew definitely that Superintendent Day could not be re-elected. Cleveland had reached a point where it was deemed advisable to try a new departure in school organization, and in looking about for a man to launch the craft Mr. Draper was chosen as the most suitable captain.

Cleveland had decided to strike out on an unknown voyage, and Judge Draper was elected to pilot the craft into calm waters—to put it in good working order and popular favor. There was not another educator in the United States better equipped for this undertaking. A splendid mixer with the people, a strong, decisive character, of deep earnestness and great working power, he pushed ahead, carrying citizens and teachers along without difficulty. He demonstrated the feasibility of such an organization and how it could be made to touch with great pressure on all points wherever stress should be placed. There was one point, however, to deal with which Judge Draper's previous experience had not fitted him, and that was the detail work of the schoolroom. So that when he had put the machine into good working order on all sides he wisely stepped aside and took another position more congenial to his tastes than helping teachers straighten out cases of discipline, placating irate parents, and watching a carping press.

Every position Andrew S. Draper has occupied he has filled with honor. Whether as State Superintendent of New York, City Superintendent of Cleveland, or President of the Illinois University, he has measured up to the highest standard of American manhood. Were I to pick out good gubernatorial or even presidential timber, Andrew S. Draper would be my first choice.

LEWIS H. JONES

Superintendent Jones supplied the element that President Draper lacked—experience in the schoolroom as a teacher and a helper of teachers. The teaching force is the agency thru which the work in school must be carried forward. The mechanical organization may be as complete as possible, the intention of the board of education may be directed along the

highest plane, the salaries liberal and paid promptly, but unless the teaching spirit is right and is directed along proper channels, the waste in instruction is immense. Superintendent Jones had been a teacher in the Normal School before he was elected to the superintendency of the schools of Indianapolis. There he came in contact with about all the diversified elements that a Western superintendent is heir to, and amidst it all he had organized the educational forces of the city till the reputation of the Indianapolis schools was second to none in this country. He was known and recognized as one of the ablest and safest men in the country, a thoughtful and careful student of the best ideas now held or that had been held by educators in historic times. Added to his reputation as a teacher is an endowment of a high and noble nature that had received embellishment from social forces. His character is a lovable one, and he advances his opinions with modesty. When he first appeared before the teachers of Cleveland, one of the lady principals of that city said: "When he began to speak we all felt that we had a friend in him." While I had been meeting Superintendent Jones annually, it was not till the meeting of the Committee of Fifteen held in Washington that I had a good opportunity to measure him all round. The work was parceled out among three sub-committees, but the real tussle was in the sub-committee composed of W. T. Harris, W. H. Maxwell, C. B. Gilbert, L. H. Jones, and J. M. Greenwood. The other two reports had been prepared in advance, and were read, discussed, and some few changes recommended. Our committee worked out the scheme in five days and nights, and discussed the propositions in a cold, bloodless way in a disagreeable room at the Ebbitt House. We could not agree on all points. Dr. Harris was unswerving in his views; Superintendent Gilbert was not quite sure just what he did want or what he stood for at times; but on every substantial point Maxwell, Jones, and Greenwood voted together without any previous understanding. Superintendent Jones was rather conciliatory, and he did more than any other member of the sub-committee to pull us together when we would get far apart. Dr. Harris must have said "yes,

yes, yes," a thousand times during the week, but his "yeses" did not always mean "yes"—he was just getting wind to pitch into something or to demolish someone's position. Frequently the gentlemen of the other sub-committees would give their individual views, and these would be accepted or rejected as the case might be. It was decided early in the session that a unanimous report contained no individuality upon questions that admitted strong argument on both sides, and each saved his exceptions in case it was necessary to use them when the report as a whole was licked into shape. Following the practice of the Council of Nice, or a Democratic or Republican primary, we voted on each proposition to get at a consensus of opinion. It was a week of the fullest and freest debate that I ever witnessed. Each said what he wanted to, or what he thought, when his time came to speak, with no one to hinder or to make him afraid. We were amazingly frank at times, and that was what Dr. Harris wanted, and in fact it suited us all. I took down the notes, and kept the original copy, from which the other members were supplied. Whenever we could not agree, we disagreed, saved the exceptions, and went on to the next order of business. At the outcome, we were not very far apart, as the report shows. In such a wide range of discussion, much of which could not appear in the report, the bearing of each of the branches on the whole curriculum of study thru the high school, college, and university, even out into active life, was considered. Perhaps no other educational committee of this country, none at least of which I have any knowledge, ever went over the ground so thoroly as did this one, and endeavored to trace each of the common branches back to its origin and function in our civilization.

It afforded an excellent opportunity to each member of this committee to bring to the bar of judgment his own contributions to the subject under discussion. While the subject dealt with elementary matters, apparently not difficult to handle, yet the breadth of the field traversed was broad and comprehensive.

The result of that week's work may be summed up in a single sentence—that the five of us left Washington with a

wholesome respect for each other's opinions. While others came and went during the week, yet we pounded away without intermission. Much of the discussion was in the nature of keen-cutting blades, and some partook of the nature of trip-hammer strokes. Whether one was hit hard or easy, it was taken good-naturedly, and on the theory that an opportunity would soon occur to get back with interest.

Superintendent Jones' mind is acute, penetrating, and acts quickly and readily, and he holds his reserve power well in hand. When pressed too closely, he is dangerous. He is too gentlemanly to be a rough-and-tumble debater. He prizes the amenities of life too highly for anything of that sort, and he always prefers to be impersonal.

WILLIAM H. MAXWELL

Superintendent Maxwell's mind works in a large way—apparently a little slow and ponderous in its movements and not always smooth running in its action. His manner of speech and of thought have been greatly influenced by the philosophy of Alexander Bain and Herbert Spencer—men who loaded both the instrument and the message it transmitted rather heavily. While with him the language and thought are both ponderous, yet he always manages to wind out his sentences in good shape and leave them spread out regularly before one. In thinking out a subject he moves cautiously, and when he once reaches a conclusion he stands by it, because of the truthfulness of the premises from which he had reasoned. For seeing a proposition intuitively or immediately, I feel confident that he possesses power in only a small degree; but for ascertaining the truth, he adheres, either consciously or unconsciously, to the methods so well outlined by Pascal and Descartes.

As a boy at school, he sat, as did all the other pupils, with his face to the wall, so that extraneous matters would not interfere with the preparation of his lessons. This was thought to be another advantage—that it enabled the master to get at the pupil's back more easily. It matters little whether he received his education from before or behind, he

believes in buckling down to close and persistent study, and it is only by hard work that anything of importance can be accomplished.

Superintendent Maxwell had introduced a resolution calling for the appointment of a committee to take into consideration the questions with which the Committee of Fifteen had to deal, and, as a consequence, he came to the meeting with his views pretty well matured. The other members had thought over the matters proposed, but had not gone far enough to be prejudiced in any direction.

CHARLES B. GILBERT

Superintendent Gilbert, as I have already mentioned, seemed to be undecided on many points. He inclined to what would be called a diffusive course of study which would lug in a modicum of everything; while not so expressing himself, this was doubtless the predominant idea seething in his mind. It should not be inferred that this particular sub-committee worked without consultation with the other two sub-committees. During the session nearly all the members were present, but each committee had its special work to do, and nearly all essentials were reviewed in detail by the entire committee. In general, the writer agreed on many points with Superintendent Balliet, yet differing widely from him on the literary unities that ought to be in school readers. All in all, there were fourteen different kinds of minds present a greater part of that week endeavoring to look steadily at a course of study based on the civilization of the race and the present needs of our children, a course that was workable, and, if fairly mastered, would put the child in a right attitude toward his country, in proper social relations with his fellows as a helpful and co-operative unit of the social whole, and above his environment he could go forward to realize his higher and better nature in spiritual power. Looking back over this meeting, as I do now, I think it was a great mistake that we did not have a stenographic report of all the discussions printed in the proceedings in full. To compare a small thing with a great one, we have the Constitution of the United States as it

came out of the Convention of 1787, but to know what the members thought, suggested, modified, despaired of, and then finally compromised on the agreement between Massachusetts and South Carolina—the actors and acts behind the stage—all this history must be learned from the debates and notes kept by the members from day to day. So it should have been with the report of the Committee of Fifteen.

J. M. GREENWOOD

SUPERINTENDENT OF SCHOOLS,
KANSAS CITY, MO.

(To be continued)

VIII

ACCIDENTS FROM COLLEGE FOOTBALL

Early in December, 1902, I sent a circular letter to the presidents of more than one hundred of the larger colleges and universities of the country, inclosing copies of the following blank with the request that they be filled out by the officer best qualified to do so, and returned to me.

_____Date

Institution_____

Place_____

	'93	'94	'95	'96	'97	'98	'99	1900	'01	'02
Male Students Enrolled.....	....	.. .	...	....	....	....	....	....	....	....
Number of Teams. (This would include 'Varsity, Class, Fraternity, and all others.).....	....	....	....	...	....	....	....	....	....	....
Approximate Number of Students who tried for places on any of these teams, *i. e.*, total number who played football..... ..	....	....	...	....	....	....	. ..	....	....	....
Number dead from effects of game.....	....	....	. ..	....	....	....	.. .	....	....	....
Number permanently injured...	....	....	....	....	....	....	....	....	....	....
Number seriously injured, *i. e.*, were forced to lose time from college work..... ...	. ..	....	....	.. .	....	....	...	. .	....	....
Was there competent medical or other supervision of training?	....	....	....	.. .	....	....	....	....	....	....

What is your opinion as to the value of the game?

Why?

Name_____

Position_____

The response was more general than even the most ardent advocate of the *questionnaire* method could have hoped for, and I wish here to thank the many in all parts of the country for the interest they have shown in this study, as expressed in various ways. In all, more or less complete returns were made from sixty institutions, including, with very few exceptions, all the larger colleges and universities of the country.[1]

Of this number 28 furnished the desired data for the entire ten years covered by the blank: Two for nine years, 1 for eight, 3 for seven, 5 for six, 4 for four, 2 for three, 4 for two; while 6 found it possible to give them only for the football season just passed. From five institutions letters were received containing general statements of averages, both as to the number playing football and injuries from the game, but these are not included in the figures given, save in the case of one permanent injury so reported. The following table gives a summary of facts reported, by years, with the exception of those for "permanent injury" and "death," which are discussed later in the paper. It cannot be supposed that these figures are mathematically precise. They cover conditions which are not ordinarily a matter of record, and which must, in many cases, be supplied from memory, but the statements are all over the signatures of competent college officers and are as valid as any which are likely to be obtained. To doubt them is to impeach either the judgment or veracity of those officers.

[1] The following institutions have figured in the present study, in most cases having furnished exact data which could be used in the tabulation: Alleghany, Annapolis, Bowdoin, Brown, Carlton, Cincinnati, Colgate, Colorado (college), Columbia, Cornell (college), Cornell, Dartmouth, Delaware, Ewing, Franklin and Marshall, Hamilton, Hampton-Sidney, Harvard, Haverford, Howard, Iowa State (college), Kalamazoo, Leland Stanford, Lombard, Marietta, New York University, Ohio (Athens), Pennsylvania, Princeton, Purdue, Ripon, Rochester, Swarthmore, Syracuse, Trinity, Tufts; State Universities of Arkansas, Colorado, Idaho, Illinois, Iowa, Maine, Michigan, Minnesota, Missouri, Montana, Nebraska, North Dakota, Oregon, Texas, Vermont, Virginia, Washington, Wisconsin, Wyoming, Western Reserve, Williams, Yale. Returns from the State Universities of California, Kansas, and Ohio, Lake Forest and Wesleyan (Conn.) were received too late to be included.

TABLE

Football Season	Male Students Enrolled	Played Football	Percentage Played Football	Number Seriously Injured	Percentage Seriously Injured	Teams
1893	10,972	1,222	11.1	40	3.3	81
1894	12,240	1,414	11.6	46	3.3	84
1895	13,911	1,617	11.6	40	2.5	100
1896	15,825	1,780	11.3	48	2.7	111
1897	19,338	2,251	11.6	52	2.3	136
1898	18,348	2,196	11.5	52	2.4	139
1899	23,802	2,586	10.8	67	2.6	149
1900	26,790	2,753	10.6	90	3.3	163
1901	29,710	2,980	10.	76	2.6	179
1902	39,398	3,967	10.	143	3.6	232
	210,334	22,766	*Av.* 10.8	654	*Av.* 2.9	1,374

As will be seen from the totals at the bottom of the table there were in the institutions covered by the study 210,334 annual enrollments of male students (*i. e.,* the equivalent of that number for one year), of whom 22,766 tried—successfully or unsuccessfully—for places on 1374 football teams. Of this number 654 were sufficiently injured to lose time from their classes, 8 were permanently injured, and 3 are reported as having died from the direct effect of the game.

In order to bring out more fully the relations between these facts, I shall discuss them as answers to direct questions.

1. *What proportion of the male enrollment of our colleges and universities play football?*

The first question was placed on the blank solely that this proportion might be determined. In some cases it was not answered, but the deficiency was supplied thru reference to the reports of the United States Commissioner of Education. Reference to the proper column upon the table shows that, according to our figures, the average percentage of male students who have played football the country over for the past ten years is 10.8: that is, about one student in ten. This proportion, I am convinced, is too small for those students who are so situated as to make football a possibility. In every case, the entire enrollment has been made use of in one term of our proportion, while in many of the larger institutions, as for

instance Harvard, Columbia, and Cornell, the professional departments are, either wholly or in part, so far from athletic accommodations as make participation in sports practically impossible. How far this should affect our proportion I do not know, but undoubtedly to a considerable extent. The percentages for the ten years taken separately show but slight fluctuation and little deviation from the general average, tho a slight falling off for the later years is noticeable. A study of the institutions from the standpoint of size shows that football is much more generally played in the smaller than in the larger. In the twenty-five institutions covered by my study, having a male enrollment at the opening of the present school year of 500 or less, 18.6 per cent. had played the game during the last ten years, while the percentage for the nineteen larger ones was but 8.3 per cent. Here again we may presume that the difference is due, in part at least, to the separation of the student body in the larger institutions. It is also, of course, true that, whenever football is played in college, at least twenty-two students must participate in the practice games, and this, in the smaller institutions, may be a considerable percentage of the student body.

2. *What proportion of the college students who play football are seriously injured?*

For the purpose of the present study I have made use of the criterion of "time lost from classes" as a measure of injury, simply because there seemed to be none other as good. The answer had to be made in terms of something definite, so this was chosen. It might be questioned, however, whether all injuries which keep a student from work are necessarily of such a nature as to warrant the use of the term "serious." I shall, nevertheless, employ it for want of a better.

Of the 22,766 students who have played for a season each, during the past ten years, 654 are reported as having been seriously injured as defined above: that is, 2.9 per cent. This seems an almost incredibly small number, but we cannot go back of the returns. It means, roughly, that one student in thirty-five of the whole number playing has received such an injury. Considered from another point of view: if each man

played in three games—a number altogether smaller than was the actual case, in all probability—his chances, on entering any contest, were less than one in one hundred that he would lose time from the effects of the game. If we are to suppose that each member of a team played six games—a number not excessive—the probability of injury is reduced to 1 : 200. Certainly not a risk which should bring many sleepless hours, even to the most timorous parent. On the whole, the table shows that injuries have been decreasing during the period studied. The larger number for the last season is due to the fact that one of the largest institutions of the country, sending returns for this year only, included not only those who were injured, but those who were "fagged out," also. The letter reads: "The number which I have set down, forty-four, represents all those who had to be taken out of the team, either as a result of injuries or as a precaution against them." This number affects the result quite materially; in fact, if the institution in question were left out of the tabulation, the percentage of injuries for the season of 1902 should be 2.7. There is nothing in the column showing the percentage injured for each separate year, to indicate excessive danger from the game as played under the rules of any particular season. "Mass-plays" may have been disastrous, but they fail to show here.

3. *What proportion of the college students who play football are permanently injured from the effects of the game?*

It is probable that in this class of injuries our figures come farther from showing the exact conditions than in the one just discussed. Altho I myself believe that the disastrous effects from overtraining in football have been much overstated in recent discussions of the game, and that organic diseases which show themselves only in the course of time are but rarely traceable to it, I am, nevertheless, willing to acknowledge that they have sometimes occurred, and also that they would probably not show in our figures, which cover permanent injuries only that are attributed to some particular accident. Of such, eight only have been reported. For four of these I have exact descriptive statements, which

I quote: (1) "Leg broken and badly set, causing permanent limp." (2) "Bones in ankle misplaced, can probably be set right by operation, yet I report it since it has been permanent to present time." (3) "The man reported permanently injured was a Freshman, who in practice this year was accidentally struck in the face and his eye injured so badly that he may lose the sight of it." (4) "The permanent injury was in a case of typhoid fever, recovered with abscess believed to have been caused by bruise on leg while playing in the first stages of disease." Of the other four injuries of this class I have no description. An analysis of those given indicates that the permanence of the first is due to poor surgery, and that of the second may be removed by good; that the third was, when reported, of but three months' standing, and that the fourth is attributable to a complication with disease. If the others are of the same character, football was accidental to them in more than one sense.

What, then, is the proportion of permanent injuries? One for each 2846 players for the last ten years; or, to show the relation expressed in the last case, on the supposition that each man played three games, his chances upon entering a given contest of being permanently injured are 1 : 8538, according to our figures. This proportion even is much too large, since statements of permanent injury and death covered in nearly every case the whole ten years, and in some the entire history of the game at the institution reporting. One of the injuries just described was, in fact, at a university which does not figure otherwise in the tabulation.

4. *What proportion of the college students who play football, die from the effects of the game?*

Whatever may be taken as an invalidation of our figures for permanent injuries would apply in the case of fatalities also. We must in any event conclude that the deaths have escaped us, or that college football is not so dangerous to life, in spite of the daily papers, as but three fatalities have been reported. For two of these I have the exact facts, as follows: (1) "One young man died from injuries received in a football game in 1899, but he had been forbidden by the Director

to play on account of a weak heart, and had been refused any place on the team. His injuries were received in a class game into which he went in direct disobedience of orders. Since that time there have been no class games." (2) "The death in 1895 was not on the regular team, but was in the case of a law student who played in a match game without training. Since then no one is allowed to play on *any* team without a permit of the medical adviser." The remaining death was in 1898, but I have no particulars regarding it.

In the matter of deaths from football, as I have been able to discover them, comparisons would mean but little: 3 : 22,766 is hardly capable of any other exposition. As was the case with the famous snakes in Ireland, the story must be short.

5. *What are the conditions relative to supervision of football training in our higher institutions?*

The answers show that in forty-two of the institutions reporting there has been competent supervision, usually by a medical officer, for the entire period covered; in eight, such supervision has been maintained for a part of the time, usually the later years, while in five no such supervision is had. Four institutions failed to report on this point.

For the institutions having no supervision the percentage of students seriously injured was 3.8, compared with 2.9 for all reporting. One of the deaths reported was in such an institution, and two of the four letters received, which are later in this paper classified as adverse to football, were from their presidents. Their records show no "permanent injuries."

The answer to the last question upon the blank, expressive of opinion as to the merits or demerits of the game of football as played in our higher institutions were particularly satisfactory, and indicative of a willingness on the part of college authorities to put themselves to a degree of trouble which the student of any educational problem cannot fail to appreciate. Covering, in some individual cases, whole pages, they form a mass of opinion on the subject which well merits publication in full. The limitations of the present paper, however, make it impossible to print at this time more than a few of the most characteristic expressions. In all, I have 58

such answers: 24 over the signatures of college or university presidents, 14 from the chairmen of athletic committees, 4 from athletic instructors, 10 signed by some other college officer; dean, secretary, or member of the general faculty. In one case the signatures of all the members of the athletic committee were attached. Their opinions I have divided into three general classes: 1st, those expressing nothing but approval of the game as now played; 2d, those expressive of modified approval, and 3d, those which are, on the whole, adverse criticism of the game. Of the first class there were 39; of the second 15, and of the third 4. The following are characteristic answers from each of these classes. In no instances have I quoted from the letter of an athletic instructor, believing that this officer might be more prejudiced in his judgment than any of the others.

First Class. (1) "Our faculty is almost unanimous in the indorsement of football. It develops manly qualities; it keeps the boys who engage in it out of dissipation, and makes them examples to the others; it promotes college spirit, and tones up the morals of the student body; it brings the students in touch with other colleges as nothing else seems to do; it affords a safe outlet for surplus energy that might be turned in other directions to the disadvantage of the students."—Chairman Athletic Committee.

(2) "Our faculty all believe in it. It makes men out of the players, and inspires the other students to win in what they undertake."—Vice President.

(3) "As game, unsurpassed. As physical exercise, moral incentive, and training in concentration of mind and energy, the game is invaluable."—Full Athletic Committee.

(4) "Great game. The best there is. I want my boy to play. Teaches grit, headwork, good temper, pluck, fellowship, and enthusiasm."—College President.

(5) "The greatest of college sports. Develops self-control, manliness, and true sportsmanship, to say nothing of college spirit."—Chairman Athletic Committee.

(6) "Value very great. As discipline, brainwork, self-

control, self-mastery, self-measurement. College spirit. Courage."—Acting President.

Second Class. (1) "So far as the effect on the physique and the morals of the men who engage in football is concerned, it is, on the whole, very beneficial. We all feel, however, that the game, as played just at present, makes too severe a demand on the physical powers of the men engaged in it, and this, of course, has its effect on the classroom work during the football season, tho not on their attendance."—Chairman Athletic Committee.

(2) "Opinion favorable, because it is an existing fact and cannot be removed without more trouble than it causes, and because, on the whole, its results are beneficial."—President.

(3) "We regard the game of football as other athletic contests, in the main helpful, but likely to be carried to excess and to bring with it some undesirable features. Under proper restrictions and control we believe it to be a good game."—President.

(4) "As to the educational value of football, I consider the game a very good one in theory, but at present, bad in practice. Foul play is possible at all stages of the game and few umpires can detect it, or having detected it, have the courage to take the men off the field. Then the strenuousness of the game is so great that men easily overstep the line of honorable conduct. My summing up of the situation will be that the game is too good to lose, but some radical measures are needed to make it fit for college grounds."—Chairman Athletic Committee.

(5) "The game has serious drawbacks, but is too valuable to be abolished. We cannot do without an active game in the fall. The present one is making for itself enemies who demand its abolition. Football has been played for six hundred years, and must be continued under reformed rules."—President.

(6) "Much more good than harm."—President.

Third class. (1) "It gives a good training to the strongest, who need it least, and does nothing for the others. It develops college spirit, but in a few cases every year it interferes with

the scholarship of a few. Severe training for a limited time does not, in my opinion, tend to permanent health and strength and prowess of continued endurance, nor is it injurious to those ends."—Dean.

(2) "I think it has very little value. Number engaging in it small; exercise too violent; physical benefit, if any, more than offset by neglect of studies during the season."—President.

(3) "In the overstrenuous way in which it is now conducted, the comparatively small number playing, the undoubted physical risk and the questionable concessions, savoring of professionalism, made directly or indirectly by most colleges to this sport, I doubt if the value of the game is worth the cost."—Chairman Athletic Committee.

(4) "Really, tho I'd like to do so, I cannot find much to approve in football as a college game. It is dangerous to life and limb; it does the mass of students no good, physically, and it brings into college life a train of demoralizing tendencies. Football fails, as I see it, to help the physical well-being of students, even those who participate most earnestly in the game. It strikes me as something wherein much energy is expended to but little advantage. There are many moral evils connected with it. Betting is more than occasional: it is quite common. Unfair methods are not exceptional. Deliberate efforts to put opponents out of the game are often winked at, if not encouraged. I wish I could view this matter from a more favorable point of view. I'd like to believe that my experience is the exception and not the rule."—President.

In the case of this last class of replies which are, on the whole, adverse to the game, I have given all that have been received; for the others, only a small proportion and those selected in such a way as to be representative of the class, rather than the most extreme cases within it. Altho I have already stated the exact numbers of answers of each class, this in itself does not indicate the weight which should be given to each, as based upon the size of the institution from which the opinion was received. Such a computation, however, shows that institutions covered by the first class of an-

swers have enrolled for the present year 21,435 male students; those of the second class, 12,371; and those of the third, 1911, while the average of such enrollment for the institutions of the three classes respectively was 735, 825, and 477 (for the four of the third class 130, 131, 300, 1350). From these figures it will be seen that the opinions, weighed in the terms of the number of students enrolled, are about 17:1 in favor of football as it is played or with slight modifications. I might add that those opinions which come from the largest institutions are less dogmatic, either in assertion of unqualified approval or disapproval, than are those from the smaller.

In computing the figures which form the basis of the present study I was struck, as the reader must also have been, at the discrepancy between them and the reports of football fatalities and serious injuries as they appear in our daily papers. During the football season, one can hardly pick up a metropolitan sheet without being stared at by one or more such reports, under heavy head lines. That the exact condition of affairs might be ascertained I wrote, early in January, to the coroners in the eight towns in which death from the game was reported during the past season in several most important dailies of the country, and also to the eighty-six persons who were similarly reported as having been seriously injured, asking full particulars. In the cases of reported deaths from the game four answers have been received, three stating that the report was entirely correct and that the fatality was wholly attributed to the game, but in no case was the player a member of a well-organized team in good training. The fourth stated that no such death had occurred, but that some years ago a man had been killed in a football game in his city. Another letter was returned unopened with the official statement, "No such post-office." Three are as yet unheard from.

In reply to the 86 other letters I have received 36 answers: 23 from members of college and university teams, 7 of public-school elevens, and 6 from those of various so-called "athletic clubs." Twenty-one letters were returned to me, uncalled for, indicating insufficient address.

Of the 23 college men, 2 stated that the report was entirely

erroneous, as they had been injured in no way during the past season. Of the remaining number 10 would not have figured in our tabulation, as no time was lost; 3 were out of the game for two days; 2 for one week, and the remainder for periods of from two to six weeks, suffering from broken collar bones or, in one case (a coach), from a broken arm, and another, a fractured leg. In every case recovery has been complete and the writer was in an apologetic mood for having so disgraced himself.

With the members of the public-school teams, the results have been more serious. One high-school boy is in an asylum for the insane, and the following from a proud member of an eighth-grade eleven indicates a wrench to his anatomy which is little short of startling. "My spine was injured and, when found, my head was between my legs resting on the ground. I was at the bottom of the pile. I was kept in the house for seventy-nine days." Of the remaining five, two were in the house one day, another two, and the others, one and two weeks each.

The members of the athletic clubs heard from seem, on the whole, to have had the most serious time of all. Two out of the six from their accounts had very narrow escapes from death, and were in the hospital for many weeks each. The others were incapaciated for periods of eight, seven, six (2), and one week, the greater number from broken limbs.

Serious as all this seems, we cannot but deprecate the tendency of the public press to cater to a timorous public by over-inflating their football news. Twice in two years, one of the foremost daily papers of our country has appeared with the scare lines "Football Player Killed" in the heaviest of black type, for no more valid reason in one case than the killing of an ex-football player by the cars at a grade crossing and the other, the electrocution of a player on a scrub team who had climbed an electric-light pole to remove the ball, which had by accident lodged in the lamp. Such mishaps should not be charged up to the game. Altho this correspondence has shown that grave injuries have resulted from the game during the season just passed, it is interesting to note that of the twenty-three college

players receiving newspaper notoriety, twelve were not in any way incapacitated for work, and every one has been on his feet for more than two months now.

In an attempt to supplement this study of accidents from college football by means of data covering other forms of sport, I wrote to several daily papers and a number of accident insurance companies for comparative figures. From one of the latter I received a little booklet in which more than 31,000 claims paid during the last five years are classified under several hundred heads. Altho there is no valid basis for a comparison between these figures and my own, since there is no means of knowing the number participating in the various activities without accident, they are nevertheless suggestive. They have I may say no direct bearing upon our study, since college students are not accepted as risks in the company.

The exact numbers of claims paid during the five years for accidents in certain sports were as follows:

Horseback-riding,	261	Gymnasium,	54
Baseball,	216	Canoeing,	49
Swimming,	97	Football,	43
Wrestling,	90	Skating,	36
Bowling,	71	Golf,	25
Hunting,	62	Boxing,	21
Tennis,	19		

As is seen, football seems far down even in this list, from which have been purposely omitted recreations like driving and bicycling, which are very generally participated in and with which comparisons would be manifestly unfair. We must conclude from the figures that unless five times as many play baseball as football the former must be considered the more dangerous form of sport. Whether this ratio would prove true or not, I have no means of knowing.

In conclusion I would say that altho I believe most emphatically in college football, I have no intention of pronouncing an encomium upon it in this paper. Even if scores of others had not been written, Walter Camp's little book would have sufficed.[2] Altho the advantages of the game have been

[2] *Football facts and figures*, Harpers, 1894

pretty fully measured in the past, its disadvantages have been largely unmeasured quantities. If the present study serves, thru a qualification of the single element of danger to life and limb, to make the sum total of opinion a larger plus quantity, I shall feel repaid for the labor.

The following summary may be of service in bringing together the main points of the paper:

1. About one college man in ten, the country over, plays football.

2. About twice as large a proportion of the men in the small colleges play the game, as in the large.

3. The proportion of men playing seems to be slightly decreasing.

4. About one player in thirty-five is sufficiently injured each season to necessitate loss of time from college duties.

5. The number of college football players who are permanently injured or die from the effects of the game is so small as to be practically a negligible quantity.

6. College football is adequately supervised in nearly all the institutions.

7. The opinions of college officers regarding the value of the game are, roughly, 17.1 in favor (weighed in terms of enrollment).

8. The newspaper reports of injuries to college football players seem to be grossly exaggerated. Not so much so in the case of players upon other teams.

9. Accident-insurance statistics would lead us to believe that many other forms of sport are more dangerous than football.

EDWIN G. DEXTER

UNIVERSITY OF ILLINOIS

IX

REVIEWS

Higher mathematics for students of chemistry and physics—By J. W. MELLOR, D. Sc., Late Senior Scholar and 1851 Exhibition Scholar, New Zealand University; Research Fellow, The Owens College, Manchester. New York: Longmans, Green & Co., 1902. 543 p. $1.50.

Space limitations restrict us to a mere indication of some salient features of this live and interesting work. Of these the most striking and significant is, properly, the point of view disclosed by the title. Successful pursuit of the later developments of physical and general chemistry demands a knowledge of higher mathematics, and our author's aim is to furnish what he has "found the regular text-books" fail to furnish, a "short road to this knowledge." For chemical and physical investigation, "higher mathematics is the art of reasoning about the numerical relations between natural phenomena." Every physical law is assumed to be representable in the form of a mathematical equation. Such briefly, is the author's faith, which colors the treatment thruout, and it would be obviously unfair to judge the work by the modern standards of precision and rigor.

Part I., called elementary and occupying the first 270 pages, presents in order chapters on the differential calculus, analytical geometry, functions with singular properties, the integral calculus, infinite series and their uses. In all cases essential notions are ingeniously, and often initially, explained in terms of physical and chemical ideas. For example, the smybol $\frac{dy}{dx}$ is introduced as suitable for representing "the rate of formation of hydrogen chloride" during a sufficiently small time interval. Trilinear co-ordinates find significance in the "graphic representation of the composition of certain ternary alloys," and in kindred connections. The point where the "steam, ice, and hoarfrost lines" concur exemplifies the concept of the triple point. And so on.

In Part II., described as "advanced," one finds a short chapter on hyperbolic functions, a compendious chapter of 74 pages showing "how to solve differential equations," and a brief treatment of "Fourier's Theorem."

Part III., covering the last 130 pages, explains "how to solve numerical equations," presents the essentials of "determinants," discusses in a most interesting fashion the doctrine of "probability and the theory of errors," and closes with valuable collections of working formulæ and reference tables.

Even if we can hardly allow that Dr. Mellor has succeeded in his attempt to find a short path, it must be said that his methods are pertinent, and the chemical or physical student who seeks a working knowledge of mathematics will not find a more helpful book or series of books covering the same subject matter.

C. J. KEYSER

COLUMBIA UNIVERSITY

Primer of right and wrong: for young people in schools and families—By J. N. LARNED. Boston: Houghton, Mifflin & Co., 1902. 167 p. $1.00.

This little book has a practical aim: to tell what right and wrong conduct means in such a way that one must see the former to be the only natural and reasonable thing. The right is that sort of quality which we find in a right line—the straightforward, direct way of getting to the point in view. The wrong is the crooked, more difficult way, the way we should not naturally take to accomplish our end, even as a crooked line is not the natural way of getting from one point to another. As a right line is the same in either direction, so, too, right conduct would be the same between man and man. Here is seen the naturalness and simplicity of the golden rule. As a body naturally moves in a straight line, so we have a natural tendency to do right. In this fashion the particular virtues are treated one by one: integrity, honesty, reciprocity (fairness), benevolence, citizenship, gentlemanliness, etc., *i. e.*, to have integrity is to be an integral whole, one consistent character, as Nature meant us to be; honesty is directness, straightforwardness in word and speech. Anec-

dotes of great men and excerpts from literature are found at the ends of chapters: *i. e.*, Franklin's rules of conduct, Marcus Aurelius, Faraday, Socrates. Nor does the author content himself with generalities: betting, gambling, and even hunting are denounced, and we are reminded that political parties are never ends, but only means. The psychological analysis of gambling is certainly clever. On the whole, as a practical appeal, the book is most successful, and should be of great use to the educator.

W. H. SHELDON

COLUMBIA UNIVERSITY

Elements of Physics—By Fernando Sanford, Professor in Leland Stanford Junior University. New York: Henry Holt & Co., xxxi + 426 p. $1.20.

Professor Sanford's work belongs to the type of text-book in which the class room and laboratory work are intended to be so combined that the one will depend upon and explain the other. The directions, however, which are given in the text for the laboratory work are very brief, and all details connected with the presentation of the laboratory experiments are left to be worked out by the teacher, so that, as the author remarks in the preface, the book "has been prepared especially for the teacher who has had an adequate training in the physical laboratory, and is not likely to succeed with any other teacher."

The most noticeable departure from other elementary text-books of this type is to be found in the arrangement of the subject matter. The subject of mechanics, for example, is developed from the principle of virtual displacements, rather than from the idea of the resolution of forces; energy relations are thus developed first, and the subject of the resolution of forces left to the last of the chapter. In the treatment of the next subject, "The properties of bodies," the properties of gases are first studied, and the kinetic theory of gases is developed here, instead of in connection with the subject of heat, as is usually done. The phenomena of heat are discussed under the following headings: Mechanical theory of heat; Effects of heat, including change of state, and the subjects of critical temperatures and pressures; Distribution of heat; and towards

the last of the chapter the subjects of thermometry and calorimetry. The order is seen to be almost the inverse of the usual one, but is well adapted to bring out the fundamental ideas in the modern theory of heat. The next subjects presented, Wave motion and Sound, Magnetism, and Static electricity, are treated in much the usual way. The subject of current electricity is introduced by a brief discussion of the theory of ions, and of the "solution pressure" theory of the galvanic cell, after which the effects of the current are treated, and at the last of the chapter is a brief presentation of the subject of electrical radiation. The last section of the book is devoted to the subject of Light radiation; the subject is developed from considerations of the changes in the wave front, rather than by the use of the fiction of rectilinear propagation. This method of presentation enables a more thorough treatment of the subject of interference to be given than is usual in an elementary work.

The book, on the whole, seems to be a very excellent elementary presentation of the more modern physical theories, but is hardly adapted to a class of beginners, unless under the direction of a teacher who is able to supplement the work by many questions and problems of a quantitative nature, so as to give precision and definiteness to the vague ideas the beginner is likely to obtain from such a treatment of the subject.

F. L. Tufts

Columbia University

By an unexcusable blunder foreign matter was introduced, in the office of publication, into the article by Professor Hibben of Princeton University, on *The relation of philosophy to graduate studies*, which appeared in the Review for March, in a manner that has largely destroyed the value of Professor Hibben's important paper. The foreign matter begins on the fifth line of the second paragraph of page 268 and extends to the last paragraph on page 271. An apology is due not only to Professor Hibben, but to the readers of the Educational Review for this blunder.